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WHITHER SOUTH AMERICA: POPULATION AND NATURAL RESOURCES

C. LANGDON WHITE
Stanford University

FEW PERSONS, save those who have made a life study of South America, have travelled widely there, or have lived for some time there, truly understand that continent and its peoples. First, as every geographer knows, every part of the continent differs from every other part: it does, however, have one common denominator—*a determination to be free and to throw off the shackles of poverty.* Said former President Juscelino Kubitschek in a letter to President Dwight D. Eisenhower on July 19, 1960:

> To wish to attribute the present unrest of these peoples [Latin American] to mere propaganda or agitation by extra-continental agents would be to ignore the fact that poverty and frustration of economically stagnant peoples have a much greater capability for agitation.[1]

A major reason for lack of understanding is the wide chasm that separates Anglo-America and Latin America. This chasm is not just the Rio Grande boundary but cultural differences. An American enters Canada and feels at home; he enters Colombia or Argentina or Peru and he senses at once that he is not at home. In the slangy expression, "Americans and Latin Americans don't speak the same language." Yet as a result of an accident of geography, the two must share the Western Hemisphere as far into the future as we can contemplate. Hence, it is not only imperative that we both get to *understand* each other better but that we *desire* to do so. William Benton expressed the situation well recently in the *New York Times Magazine:*

> The problem is psychological as well as economic—as friendship usually is. We must seek friendship sincerely out of the genuine liking and admiration the people of Latin America deserve from us. We must be concerned about our neighbors—not because it is the strategic thing to do, nor because this is an election year, nor even because there are more and noisier Communists south of us than there used to be—but because as neighbors we are intricately bound together.[2]

In this paper I want to call attention to: (1) the rapid population growth in South America, (2) the poverty of the masses, (3) the standard of living of the people, (4) the natural-resources base, (5) whether the masses are benefiting from the rich natural resources, (6) the possibility of industrialization accomplishing what its devotees believe it can, and finally (7) what I think the future holds for the continent.

First, however, let us spend a few moments getting the feel of the land that is South America.

Aboriginal South America

When the explorers first reached South America, the continent was almost empty. Except for the montane area occupied by the Chibchas and the Incas (Colombia

[1] *New York Times,* July 30, 1960.

[2] William Benton, "The Communist Threat at Our Back Door," *New York Times Magazine,* July 17, 1960, p. 44.

southward to northern Argentina and Chile), which sustained prosperous populations practicing scientific argriculture based upon the production of corn, potatoes, beans, squash, pumpkins, tomatoes, and many other crops, the continent was thinly inhabited by nomadic hunters, fishers, and farmers. Probably the total population at that time did not exceed 10,190,200. Today the picture has changed: there are presumably 136,122,000 inhabitants there. However, this is not a dense population—only 19.7 persons to the square mile. Yet the geographer knows that only 22 per cent of South America is arable (including pasture land), that a very large portion consists of high mountains, deserts, rain forests, and savannas, all presumably incapable of supporting prosperous and dense populations. One-third of the total population dwells within less than one-twentieth of the continent's total area and at least one-half of South America is virtually void of human beings.

The present pattern of population distribution comprises dense rural congestion only in the environs of the towns and cities, which, for the most part, are separated from each other by vast empty areas. South America's is a peripheral population distribution, there being nothing to compare with the Midwest of the United States. Only the populous areas are well served by railways and only the Pan-American Highway accomplishes very much in tying or linking the various countries and regions. Rural areas are often poorly served by road and rail. Consequently those persons living near or relatively near the ocean without access to highway or railway seek their own outlet to a river or to the sea. And thousands of Indians are born, live, and die in the high Andes without ever getting as far as 50 miles from home.

Population Growth

During the past 35 years, population in South America has increased rapidly—by 84 per cent in the tropical segment, by 81 per cent in the temperate part. Currently South America is growing at a faster rate, population-wise, than any other continent—2.3 to 3 per cent (Fig. 1). This rate compares with a world rate of 1.7 per cent. So rapidly is the population increasing that it is expected to double in 20 years. Fortunately, this phase of rapid population growth is coming at a time when the existing density is not great. There are today approximately 136,122,000 people; in the last half of this century the population is expected to quadruple. The rate, of course, will vary from country to country. It is not fair to think of South America as a unit when discussing population. Brazil is growing so rapidly that it is expected to have 100 million inhabitants in the foreseeable future. Tiny Uruguay, on the contrary, is growing at a much slower rate and never can hold a large number.

Most of the South American countries are underdeveloped and it is these very ones, where additional people are least needed, that are contributing most to the population explosion. These countries are accordingly experiencing an unprecedented population growth, an increase, however, that does not reflect economic expansion but actually impedes it. Economic development is a race between population increase and growth of output, incomes, and opportunities. The population situation today differs from that of the past when the most rapid growth took place in lands where greatest progress was being made.

Food supply and population in South America are running neck and neck, and while the situation is not so serious here as in parts of Asia, it promises to become more grave with each passing year. In fact, one authority on Latin America has said that despite the fact that South America is one of the world's emptiest regions it nevertheless is suffering from overpopulation.

Death rates are declining. Life expect-

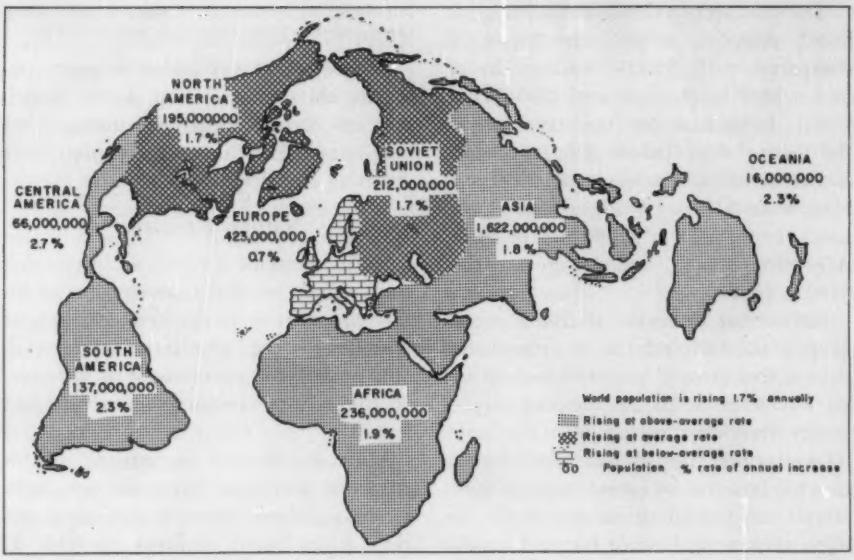

FIG. 1. The World's Population and Growth. The annual world increase is 48 millions: Africa 4.4 millions; Latin America 4.8 millions; Soviet Union 3.5 millions; North America 3.3 millions; Europe 2.9 millions, and Oceania 0.4 million. (From map by Courtesy of *The New York Times*.)

ancy at birth which until recently was about 38 years, is today approaching 50 years. For some years, at least, birth rates are expected to decline less rapidly than death rates.

As elsewhere among the world's underdeveloped countries, there is in South America much outmigration from the farms to the cities. More than one-fourth of the total population now dwells in cities of 20,000 or more and the present surge continues on course. This trend is most marked in Argentina where two-thirds of the total population dwells in urban centers, about one-half in Buenos Aires. Except for Argentina, Chile, Uruguay, and Venezuela, however, this migration to cities is not causing the agricultural population to diminish to any extent.[3]

Poverty

Economic and social unbalances plague most of the South American countries. It is no exaggeration to say that the vast majority of the people suffer from wanton and biting poverty. South America does not produce enough food to provide her people with an adequate diet. Not only do the masses of peoples not get *enough* food (calories average less than 2,500 per day), but they do not get enough of the *right kind* of food. They lack the essentials of a balanced diet, getting insufficient meat, dairy products, vegetables, and fruits. There is too much reliance on cereals. Particularly is this true in tropical South America, where the heat and moisture cause health disorders even among the natives and make most difficult the climatic adaptation of immigrants. The food is rich enough in carbohydrates and fats but is short in proteins, iron, calcium, and A and B vitamins.[4]

[3] C. Langdon White, "Blueprint for Latin America: Factories or Farms?," *Vital Speeches of the Day*, Vol. 26 (August 1, 1960), p. 638.

[4] Ernst Thonnard-Neumann, "Klinische Beobachtungen zu Klima und Ernährung in Kolumbien," *Zeitschrift Fur Tropenmedizin und Parasitologie*, Band 8, Stuttgart, September, 1957, p. 376.

The per capita average annual wage in South America is pitifully low—$170, compared with $2,149 in the United States, $380 for Europe, and $310 for the USSR. In at least one country, Bolivia, the figure dips below $100; in four, Brazil, Ecuador, Paraguay, and Peru, it runs from $100 to $199; in one, Venezuela, from $200 to $299; and in three, Argentina, Chile, and Uruguay, from $300 to $699.

Differences in levels of living are in general inversely related to present and prospective rates of population increase. By any level of living, the majority of South Americans are far down the scale. The educated, upper-class South Americans explain this by saying that too many people are dependent on agriculture—on unproductive, primitive farms—for their living. To be sure, nearly 80 per cent of the total population is dependent on agriculture. Most of the farms are small: plowing is frequently by bullock power with plows made of wood. Much plowing in the mountainous areas still is by foot plow and much cultivation by hand. Considering that agriculture is carried on in a primitive and empirical manner over so much of the continent and under adverse climatological, topographical, soil, and agronomical conditions, it is little short of a miracle that the farmers have procured even the meagre yields they have for so many centuries and that they have supported so many millions of people. One of South America's biggest problems is to increase yields per acre, which rank extremely low in relation to most of the other continents. Progress moves forward at a snail's pace in the fields of fertilizer, mechanization, and better methods. But improvements even along these lines can hardly be expected to solve South America's growing population problem. I agree with Charles Darwin when he says:

> I conclude that all the effort of attack on the population problem must be aimed at controlling the numbers, rather than their means of life.[8]

Such dire poverty makes it quite simple for the demagogue or skillful politician to arouse underfed, unemployed people to follow him and to exploit their yearning and despair.

Natural Resources

South America already is a very rich continent in natural resources but its future promises to be far brighter than its past and present. The limited time available permits me to comment on only two of the natural resources—minerals and forests.

Minerals. Most of the mineral wealth has been developed along the periphery of the continent because systematic surveys have been confined thereto. It should be emphasized, however, that the continent is not rich in all minerals. Thus in a recent year South America contributed about 20 per cent of the world output of copper and lead and zinc, and 16 per cent of the tin. It also contributed 33 per cent of the petroleum and 20 per cent of the iron ore entering world trade. The commercial reserves of iron ore are estimated at 25 billion tons—30 per cent of the estimated world total—and the potential reserve is double this figure. Brazil is credited with having virtually the entire world supply of quartz crystals, a strategic material much in demand by the electronics industry. Manganese, the indispensable mineral in steelmaking, is widely distributed. Bauxite is present in all three Guianas, Venezuela, and Brazil. Scattered throughout the continent are deposits of tungsten, beryllium, vanadium, molybdenum, antimony, industrial diamonds, graphite, and bismuth. Three of the mineral group—petroleum, bauxite, and iron ore—are on the way up.

[8] Charles Darwin, "Population Problems," *Bulletin of Atomic Scientists*, Vol. 14 (October, 1958), pp. 322-324.

Two traditionally important ones are receding: (1) Bolivian tin, most of which is in remote areas, is difficult to smelt, and is facing exhaustion as the richer veins are worked out; and (2) Chilean nitrate, which is unable to compete with synthetic nitrates.

The biggest single weakness in the South American minerals picture is the paucity of coal: only Colombia, Peru, Chile, and Brazil carry on commercial mining. Nowhere in the continent is there a high-quality coking coal.[6] South America is poorest of all continents in coal, its reserves amounting to a mere 0.1 per cent of the world total.

The importance of minerals varies with the individual countries. In Venezuela, petroleum accounts for 92 per cent of total exports; in Chile, copper accounts for 71 per cent, and in Bolivia, tin for 71 to 78 per cent. On the other hand, Paraguay and Uruguay, which are predominantly agricultural and pastoral, mine and export virtually no minerals.

Domestic consumption of minerals within South America is small, the bulk of all output being destined for export. Thus Venezuela, Chile, Bolivia, and even Peru depend heavily upon their mineral wealth as a major source of foreign exchange. As a result, fluctuations in world mineral markets cause chills and fevers in their economies. Thus the Venezuelan government's revenue from oil operations fell from $923 million in 1958 to $781 million in 1959.[7]

All of the mineral-rich countries are highly nationalistic and are determined to manufacture at least part of their output or to process their minerals in some degree prior to export. However, the speaker is convinced that for a long time in the future, the bulk of the mineral output must be destined for export. The degree of exploitation of South America's minerals will depend in large measure upon the investment climates presented by the various countries. In all of them foreign companies (and only they possess the financial resources and know-how for development) today must be prepared to take risks.

Forests. Another major resource, scarcely touched as yet by man, is the forest. South America embraces the greatest surplus region on earth.[8] Roughly 39 per cent of the land area is in forest. It is a predominantly hardwood forest. The variety of tree species is very great—possibly as high as 10,000.[9] Furthermore, there is wide variation in wood density, some species being lighter than cork, others heavier than water. The most abundant stands of timber are to be found in the great river valleys and it is in them that man has removed the most timber, since the majority of towns and cities are situated on rivers used as highways. To date, aside from a few local exceptions, man has not made great headway in his conquest of the South American tropical rain forest. Most progress has been made: (1) in the small Paraná pine forest area of Brazil, which has to date proved to be of greater economic importance than all the thousands of square miles of hardwood forests in the entire Amazon Basin; and (2) in Chile, where though only 22 per cent of the area is in forest, fortunately almost pure stands (93 per cent hardwood) predominate. The wood is of a quality that compares favorably with that of other principal hardwood forests in the temperate zone. Proximity to tidewater and to railroads and the nature of the terrain favor exploitation in Chile.

[6] John D. Price, "Some Aspects of Latin American Coal Reserves," American Institute of Mining and Metallurgical Engineers, New York, 1953.

[7] *Latin-American Business Highlights*, Third Quarter, 1960, p. 5.

[8] Food and Agriculture Organization of the United Nations, *Forestry and Forest Products: World Situation, 1937-1946*, Stockholm, August, 1946, p. 28.

[9] *Ibid.*, p. 29.

Monoculture

Much of South America's wealth is now inaccessible because of the barriers of jungles, mountains, and rivers. Partly, though only partly, as a result of this condition, South Americans have developed their economy around one or two basic products, for example, Venezuela, oil and iron ore; Colombia, coffee; Ecuador, bananas; Peru, cotton and sugar and copper and iron ore; Bolivia, tin; Chile, copper and nitrate, and Uruguay, wool. Hence a decline in the prices of coffee, or copper, or sugar, or wool results in much hardship. Possibly the economies of no other countries are so tied to monoculture as those of Latin America.

Transportation and Communication

All of us here are acquainted with the railway and highway maps of South America. To citizens of the United States, they are not impressive.

Economic integration must become the watchword. Some years ago when Avila Camacho was President of Mexico he pointed out that of 22 million Mexicans, only 6 million were really part of the economic system. The other 16 million, he said, lived in almost complete isolation from the rest and from each other. They are isolated, Avila Camacho believed, because they are poor, and they are poor because they are isolated. And so it is, likewise, for too much of South America.

Will Industrialization Help?[10]

In virtually all the literature dealing with the many problems of our neighbors to the south is the theme that industrialization can become the magic wand for relieving the continent's economic ills. Demagogues, politicians, professors, journalists, and others urge that more industrial plants be constructed and they defend avidly the manufacturing already under way. Those in power are extremely sensitive to any criticism of this program.[11] In 1948, the Abbink Commission was sent to Brazil to make an economic study. Its report was not well received by a number of responsible Brazilian officials because the Commission had urged, among other things, that a brake be put on industrial expansion unless agriculture and transportation were given parallel development. Colombia went ahead with its iron and steel industry at Paz del Rio (Benecito) despite friendly, sympathetic, and wise advice from the Curry Commission (International bank for Reconstruction and Development).[12] There are numerous examples of South American countries embarking on ambitious projects on the basis of no more than the general desire to industrialize and with inadequate information regarding the bases operative in the scientific location of industry, upon which the success of such projects depends. The sporadic voices of caution invariably are ignored.

Industrialization in South America faces five major difficulties:

(1) The prevailing biting poverty and the widespread illiteracy of the people, which restrict the market for fabricated products and reduce the supply of skilled workers to man the plants.

(2) Scarcity of local capital. In preindustrial societies, prestige lies in land ownership. The well-to-do (and these are a mere veneer numerically in South American countries) traditionally have been uninterested in manufacturing.

[10] C. Langdon White, "Industrialization: Panacea for Underdeveloped Nations?," *Yearbook*, Association of Pacific Coast Geographers, Vol. 17 (1955), pp. 3-20.

[11] "The industrialization fetish is dying hard. . . . However, with the years, the weaknesses as well as the strengths of hothouse industrialization have become more apparent." (From *Latin-American Business Highlights*, Third Quarter, 1958, p. 6).

[12] C. Langdon White and Donald J. Alderson, "Steel and Symbolism at Paz del Rio," *Inter-American Economic Affairs*, Vol. 9 (Spring, 1956), pp. 82-94.

Capital from the masses is an illusion; the majority of the people live too close to the level of bare subsistence to have funds for creating new real capital. Accordingly, for many years to come industrialization must depend to a very considerable degree upon foreign capital. However, for foreign capital to enter a given country, the investment climate must be good and the political situation must be reasonably stable. Elmer W. Pehrson, authority on mineral economics, states that very few underdeveloped countries have realistic laws and regulations that encourage private capital to invest in the development of minerals.[13]

(3) The prevalent concept of national self-sufficiency—that a country must have industrial plants and that these must make use of domestic raw materials even at high cost. It is difficult, for example, to understand how a country like Argentina can justify a large integrated iron and steel industry from an economic standpoint.

(4) Inadequate transportation. With few exceptions the railroads are so poorly integrated with the settlement pattern that the movement of goods is very costly. The early railroads financed and built by British and French interests were designed principally for the transport of raw materials to seaports and hence are not adequate for the correlation of manufacturing industries producing and distributing consumer goods for the domestic market. More often than not a country's railroads are of several gauges.

(5) The scarcity of technological know-how. The traditional education has not been along engineering and scientific lines. This deficiency, however, is presently being corrected. It is reliably reported that Latin Americans respond well to training in U.S. techniques. Hundreds of young men are learning skills in the United States, Western Europe, and the USSR.

Also it must be remembered that industrialization is not spontaneous but is a process of social change that takes place over a considerable period of time. The South American countries underestimate this fact, not realizing that it required about two centuries to prepare the West for the advent of the industrial era.

Is industrialization the panacea as their leaders tell them it is? I do not think so. South America lacks many of the fundamental bases for successful and profitable industrialization (particularly for heavy industry, which she is determined to have)—capital equipment, technological know-how, sizeable market with adequate purchasing power, suitable transport facilities, sufficient raw materials, and others.[14] Furthermore, a vital precondition for industrialization in such lands is a shift from subsistence to commercial agriculture, for nowhere on earth does subsistence farming provide more than a bare living. This change in itself would mean a colossal upheaval of the economy.

Industrialization is merely one in a list of several major circumstances that may contribute to raising the level of living throughout South America. Even more important is population control. Obviously, many hurdles lie athwart this path—some economic, some political, some religious. But with the birth rate remaining static or almost static, while the death rate falls, the continent faces in the future an almost insuperable problem unless the rapid increase in

[13] Elmer W. Pehrson, "Minerals in National and International Affairs," Chapter 11, in *Economics of the Mineral Industries*, American Institute of Mining, Metallurgical and Petroleum Engineers, New York, 1959, p. 512.

[14] Preston James, speaking of Argentina, says, "But no great country in the world seems to be so thoroughly lacking in the mineral and power resources on which manufacturing industry must be supported. In Argentina there is an abundance of raw materials from the farm and ranch, and even some sources of industrial minerals; but there is a notable lack of power resources." (Preston James, *Latin America*, 3rd ed., The Odyssey Press, Inc., New York, 1959, p. 357.)

population is curtailed. Our optimistic philosophy leads us to believe that a balance in population will come automatically, that technology will provide the food and other necessaries in the proportions needed. I would prefer to agree with Harrison Brown:

> . . . unless human fertility decreases fairly rapidly, which seems unlikely, it is doubtful that the lot of the average person in Latin America will improve appreciably during the course of the next century. Indeed, it seems likely that we see in Latin America a vast continent-wide slum in the making. There will be considerable differences between areas, but the region as a whole seems destined to be an impoverished one far into the future.[15]

The countries of South America show little promise of getting into the same industrial league as the United States, Great Britain, West Germany, the USSR, and Japan. Industrialization indisputably does have a prominent place in sound plans for raising the standard of living of the South American nations. But an impressive and economically sound industrialization, at least in the heavy category, cannot come fast—it must come by evolution not by revolution.

The need is for each country to appraise its potentialities dispassionately and to define its course of action undeluded by the glamour of industrialization or any other single remedy.[16]

Whither South America?

Tad Szulc, *New York Times* correspondent in Latin America, has aptly said, I believe, that the Latin American problem

> In a nutshell . . . is still that of the starving man with a gold mine under his feet . . . of a continent unable to develop its immense natural resources fast enough to take care of expanding populations no longer resigned to substandard existence.[17]

They are, however, like underdeveloped peoples the world over, waging their so-called "revolution of rising expectations." It will take more than wishful thinking or even demands on the developed countries to improve their lot substantially. Their rapid population increase imposes a severe burden on efforts to raise their level of living. Thus the South American countries will have to increase their aggregate income four-fold by 1975 to maintain their present level of living and eight-fold by the year 2000 to raise their per capita income to the European level for 1950. Will they be able to do it? I do not know but I do know that most of the people are poor and getting poorer.

> The Hungry World [of which South America is an integral part] finds itself caught in the trap of its own fertility . . . writhing in misery, watching the developed countries get steadily richer while [they] the underdeveloped get poorer.[18]

All South American countries are in the painful throes of a social, economic, and political revolution: a few are in advanced stages but most are just getting under way.[19] The troubles of South America as a continent are far too deep and complex for quick or easy solution.

Does the situation appear hopeless? It is less dark than for most underdeveloped lands, since parts of South America, as has already been pointed out, have rich natural resources and a still relatively sparse population. Nonetheless, I don't see how any informed person can be very optimistic. The continent's needs are immense and the individual countries cannot meet them by themselves. What are these needs? Everything from small engines to nuclear power plants, from small

[15] Harrison Brown, "Life in the Americas During the Next Century," *Annals of the American Academy of Political and Social Science*, Vol. 316 (March, 1958), p. 15.

[16] C. Langdon White and Donald F. Alderson, "Industrialization: Panacea for Latin America?," *Journal of Geography*, Vol. 56 (October, 1957), p. 332.

[17] Tad Szulc, "Basic Questions About Latin America," *New York Times Magazine*, February 21, 1960, p. 64.

[18] John Scott, *Democracy Is Not Enough: A Personal Survey of the Hungry World*, Harcourt, Brace and Company, New York, 1960, p. 62.

[19] Edwin Lieuwen, *Arms and Politics in Latin America*, Council on Foreign Relations, New York, 1960.

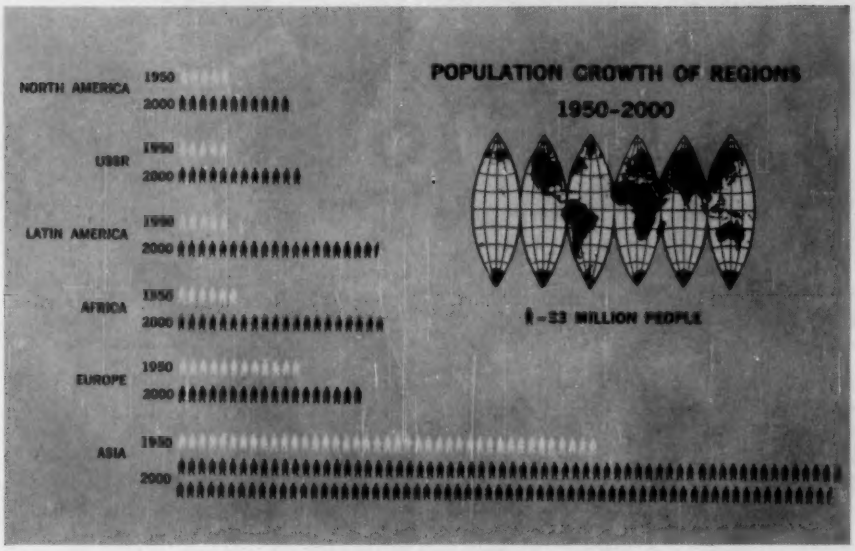

FIG. 2. World Population Growth 1950-2000. (Courtesy Population Reference Bureau.)

farm implements to combines and tractors, the latter by the hundreds of thousands; improved seeds, more fertilizers, insecticides, fungicides, and herbicides; above all else, the "knowhow" to save what their people have already nearly ruined and to develop the vast potential thus far hardly tapped.

What South America suffers from most is almost total underdevelopment of all its resources, natural and human. The speaker may be on the pessimistic side but he is convinced that the efforts of the South American countries to raise their level of living while experiencing rapid population growth is not "in the cards."

Some actually think that South America needs more people (Fig. 2). I definitely do not. Clearly, it is not population increase that brings prosperity to nations; rather it is *increase in output of human labor* that does. The product per unit of labor is not increased by increasing human numbers. Especially is the task hopeless for those countries with large and fast-growing populations with respect to meagre natural resources.

An additional facet of this problem should be mentioned. The migratory trend toward cities may result in lower fertility for it is well known that fertility is lower among urban than among rural dwellers. Moreover, literacy is increasing and educated groups have lesser fertility than uneducated groups.[20] Perhaps then in some 50 or 100 years, with the majority of South Americans living under conditions of urbanism, industrialism, and enlightenment, the birth rate might diminish.

The picture I have painted has been quite grim and this despite the plethora of natural resources. However, geographers are realists: there is no escaping the fact that the present is a time of crisis.

Selected References

Bennett, M. K.: "Population and Food Supply: The Current Scare," *Scientific Monthly*, 68:17-26, January, 1949.

Browning, H. L.: "Recent Trends in Latin American Urbanization," *An-*

[20] C. Langdon White, "Blueprint for Latin America," *loc. cit.*, p. 6; p. 21.

nals of the American Academy of Political and Social Science, 316:111-120, March, 1958.

Foreign Agricultural Service, U. S. Department of Agriculture, *Agricultural Geography: Latin America,* May, 1958.

Hainsworth, R. G.: "How Many People Can the Earth Feed?," *Foreign Agriculture,* 17:22-29, February, 1953.

Luck, J. Murray: "Man Against His Environment: The Next Hundred Years," *Science,* 126:903-908, November 1, 1957.

"Symposium on World Food and Population." *Discovery,* Vol. 21 (October, 1960), pp. 419, 456-457.

Tietze, C.: "Human Fertility in Latin America," *Annals of the American Academy of Political and Social Science,* 316:84-93, March, 1958.

United Nations, Bureau of Social Affairs, Population Branch, *The Population of South America, 1950-1980,* Report II, Population Studies, No. 21, New York, 1955.

White, C. Langdon: "World Population, World Hunger, and World Resources," *Vital Speeches of the Day,* Vol. 25 (May 15, 1959), pp. 462-465.

White, C. Langdon: "Underdeveloped Lands," *Focus,* Vol. 10 (September, 1959), pp. 1-6.

MIDDLE AMERICA, LAND OF TOO MANY AND TOO LITTLE

PAUL CROSS MORRISON
Michigan State University

THE READER was recently both amused and struck by the timeliness of an issue of the comic strip "Peanuts," which showed one child telling another about the birth of two babies in their neighborhood and remarking that this was part of the population explosion. The reply of the second child was that he "never heard a thing." Far too few people have "heard the noise" of the current population explosion, or are more than vaguely aware of its implications and of the possible dangers which can emanate from areas of over-rapid population growth to adversely affect other parts of the world community. This paper is concerned with some aspects of population growth in one of these areas, Middle America. If anything is added to the "audibility" of the population explosion, its purpose will have been accomplished.

Middle America is here understood to include Mexico, Central America, and the Caribbean islands. While there are many elements of diversity within this area, there are also some striking uniformities. The political divisions are mostly small, technologically underdeveloped and, in the estimate of many observers, resource-poor. The economies are still largely agrarian and there is commonly too great dependence on the export of one or two products for foreign exchange. Living levels are low, populations are young and illiteracy is high everywhere, but these peoples, like those elsewhere in underdeveloped parts of the world, have rising expectations of a better life. A major factor working against the achievement of such aspirations, however, is that population growth rates have recently been among the highest in the world and promise to continue so, for at least some decades to come. Unanswered questions are whether economic development can outrun population growth, and if it does, whether the lead will be great enough to cause any significant rise in the level of living of the majority of people.

Population

During the five year period 1950-55, the population growth of 15 per cent in Central America (including Mexico) was the highest in the world. The 9 per cent expansion in the Caribbean part of Middle America, although less than in eight other of the nineteen regions into which the world was divided for comparative purposes, was larger than the world average of 7.8 per cent.

Before that, between 1925 and 1950, the increase of 55 per cent in the Caribbean was exceeded only in Tropical South America, Central America, and Temperate South America, while the growth of 65 per cent in Central America was second only to that of Tropical South America where it was 67 per cent. By contrast, the percentage of population expansion during the same twenty-five years was only 11 in Northern and Western Europe, 33 in Northern America, and 31 in the World as a whole.

Recent population growth has not only been rapid, but it has accelerated, and there is little prospect except that this will continue in the near future. Projections by the Population Branch of the United Nations indicate, that on a basis of low and high assumptions, the population of Central America will grow 92-108 per cent between 1950 and 1975, faster than in any other region of the world. The number of people in the Caribbean, where some escape by emigration is possible, is expected to expand 54-66 per cent. Other growth percentages envisioned are 12-16 in Northern and Western Europe, 38-43 in Northern America, and about 53 for the World.

Comparison of these figures with those already given for 1925-50 show the extent of the increase in the rates of growth expected. It should be kept in mind that the larger percentage during the 1950-75 period is of a larger population base, so that the actual increase in number of people will be even more impressive. Central American population, for example, will have mushroomed from 21 million in 1925, to 34.7 million in 1950, to possibly 72.8 million in 1975; that of the Caribbean from 10.5 to 16.3, to 27.1 million during the same years.

Looking still farther ahead, and stating the facts in a different way, it can be reasonably expected that the population in the year 2000 per 100 people in 1950 will be about 432 in Central America, 294 in the Caribbean, 135 in Northern and Western Europe, 186 in Northern America and 251 in the World.[1] Obviously, problems associated with population pressure promise to become much more acute in Middle America, and therefore of increasing concern there and abroad, during the remaining years of this century.

Population changes occur as a result of births, deaths and migration. A steep decline in mortality rates, as a consequence of the introduction of modern sanitation and medical practices, accounts for the rapid population rise in Middle America. Birth rates have remained high and in some cases appear even to have risen slightly. Migration has actually had a negative net affect, more people leaving the area than coming to it.

In 1958 birth rates in Middle America were below 37 per 1000 population in only Cuba and Puerto Rico, and ranged from 48.7 in Guatemala to 26.7 in Cuba (Table 1). The death rates, however, were below 13.5 (the figure for El Salvador) in every country except Guatemala and Haiti. The rate in Guatemala was 21.3, but there were seven Middle American countries reporting lower mortality than the 9.5 per 1000 population in the United States. The rate of natural in-

[1] All statistics previously given: United Nations, Department of Economic and Social Affairs, *The Future Growth of World Population* (ST/SOA/Series A, Population Studies, No. 28), New York, 1958, pp. 2, 23, 26.

TABLE 1

Middle American Demographic Data

	Birth Rate 1930–34	Birth Rate 1958	Death Rate 1958	Natural Increase 1958	Estimated Mid-1958 Population (Thousands)	Area (KM^2)	Population Density Mid-1958 (KM^2)
United States	17.6	24.3	9.5	14.8	174,782	9,363,387	19
British Honduras	37.4	46.8	9.3	37.5	85	22,963	4
Costa Rica	45.7	38.7	9.0	29.7	1,076	50,900	21
Cuba	19.5	26.7(1)	7.0(1)	19.7(1)	6,466	114,524	56
Dominican Republic	35.8(2)	41.3	8.4	32.9	2,797	48,734	57
El Salvador	43.3	47.3	13.5	33.8	2,434	20,000	122
Haiti	?	?	?	?	3,424	27,750	123
Guadeloupe (inc. dep.)	37.3(3)	38.4	9.4	29.0	257	1,779	144
Guatemala	51.6	48.7	21.3	27.4	3,546	108,889	33
Honduras	33.5	43.0	11.1	31.9	1,828	112,088	16
Martinique	35.3(3)	38.7(4)	10.3(4)	28.4	264	1,102	240
Mexico	44.5	44.5	12.5	32.0	32,348	1,969,269	16
Nicaragua	35.9(5)	43.0(6)	8.7(6)	34.3(6)	1,378	148,000	9
Panama (7)	36.5	39.3	8.7	30.6	995	74,470	13
Puerto Rico	40.6	32.7	6.9	25.8	2,321	8,897	261
West Indies Federation	32.3(9)	37.1(8)	10.0(8)	27.1(8)	3,128	20,731	151
Barbados	32.8	30.3	9.8	20.5	235	431	544
Jamaica (ex. dep.)	33.6	38.1	8.8	29.3	1,630	11,424	143
Trinidad and Tobago	30.3	37.6	9.2	28.4	789	5,128	154

(1) 1950–52; (2) 1935–39; (3) 1946–49; (4) Excludes live born infants dying before registration of birth; (5) 1933–34; (6) 1957; (7) Excludes Canal Zone and certain tribal Indians; (8) 1956; (9) 1932–34.
Source: United Nations, *Demographic Yearbook, 1959*, pp. 114–116, 206–209, 545–547.

crease was therefore very high. It was generally between 2.5 to 3.5 per cent, which was roughly two to three times that in the United States, where it was 1.4 per cent (Table 1).

Death rates in most of Middle America will fall further; birth rates show little sign of receding. Industrialization, urbanization and education have not yet developed to a point where they are noticeably affecting the high fertility built into the cultural pattern. A recent United Nations study, for example, states that in Central America (including Mexico), "only after a fall in birth rates, greater than the decline of death rates, which can hardly be expected to occur before 1980, is there any prospect of slower growth."[2] Davis, Tietze, Brown and others agree.[3]

Population Problems of Underdeveloped Countries

It has been said that population enters into the problem of achieving satisfactory living levels in underdeveloped countries, such as those of Middle America, in three main ways. First, the rapid increase of population creates a heavy load of dependent children per adult; second, it aggravates shortages of capital by requiring increasing investments to merely keep up the current low level of per capita production; and third, it raises the density of agricultural population in relation to the area of cultivated land. Even in an underdeveloped country where population growth would be economically advantageous in the long run, progress will be hindered by too rapid

[2] United Nations, Department of Economic and Social Affairs, *The Population of Central America (Including Mexico), 1950-1980* (ST/SOA/Series A, Population Studies, No. 16), New York, 1954, p. 14.

[3] See "A Crowding Hemisphere: Population Changes in the Americas," *The Annals of the American Academy of Political and Social Science*, Vol. 316 (March, 1958). This group of sixteen papers is highly recommended reading.

TABLE 2

MIDDLE AMERICAN ECONOMIC DATA

	Per Cent Under 15 Years Old About 1950*	Per Cent Illiterate About 1950*	Per Cent Labor Force In Agr. About 1950*	Per Cent Area Cropped*	Per Cent Area in Pasture*	Population Per Sq. KM. Cropped†	Population Per Sq. KM. Cropped and in Pasture†
United States	26.9	3(2)	12	20.1(4)	27.3(4)	93	39
British Honduras	38.4(1)	19(1)	40(1)	? (3)	? (3)	?	15
Costa Rica	42.9	21	55	5.5(5)	14.2(5)	383	104
Cuba	36.4(3)	22(3)	42(3)	17.2(1)	34.0(1)	328	110
Dominican Republic	44.5	57	56	13.9(7)	12.0(1)	411	222
El Salvador	41.7	61	63	27.2	35.2	447	195
Haiti	38.0	89	83	13.3	18.0	925	393
Guadeloupe (inc. dep.)	39.2(4)	?	?	27.0(7)	6.2(7)	535	505
Guatemala	42.3	71	68	13.5	5.3	241	173
Honduras	40.6	65	84(6)	8.9(5)	17.8(5)	183	60
Martinique	38.5(4)	26(4)	?	48.1(7)	21.8(7)	498	342
Mexico	41.8	43	58(7)	10.1	34.2	162	37
Nicaragua	43.3	62	68	5.8(2)	4.3(2)	161	92
Panama	41.6	30	50	6.0(2)	7.4(2)	221	99
Puerto Rico	43.2	27	37	37.2(7)	35.1(7)	701	360
West Indies Federation	?	?	?	26.0(8)	13.4(8)	580	383
Barbados	33.4(5)	9(4)	29(1)	65.0(7)	11.6(7)	839	712
Jamaica (ex. dep.)	36.1(3)	?	49(3)	19.9(7)	21.9(7)	718	341
Trinidad & Tobago	41.5(5)	26(4)	25(6)	33.9(7)	1.2(7)	453	438

* Year 1950 except (1) 1946; (2) 1952; (3) 1953; (4) 1954; (5) 1955; (6) 1956; (7) 1958; (8) 1955–58.

† Approximation obtained by dividing estimated mid-1958 population by area cropped (including land under tree crops) and area in permanent pasture for same years used in figuring *Per Cent Area Cropped* and *Per Cent Area In Pasture*.

Source—Column 1 (age): Vasilios Valaoras, "Young and Aged Populations," *The Annals of the American Academy of Political and Social Science*, Vol. 316 (March 1958), p. 70; Column 2 (Illiteracy): Unesco, *Basic Facts and Figures* (Paris, 1960), pp. 27–28; Column 3 (Labor force): FAO, *Production Yearbook, 1959*, pp. 19–20; Other Columns: calculated from data in FAO, *Production Yearbook, 1959*, pp. 3–4 and United Nations, *Demographic Yearbook, 1959*, pp. 114–116.

population increase.[4] Spengler has developed the point that population growth can also be income depressing in an advanced country like the United States, because it "absorbs capital and resources which might otherwise be used to increase equipment per worker and consumption per head" and because it "makes the cost of raw materials higher."[5]

The population structures in Middle America are characterized by some of the heaviest concentrations of children anywhere on earth. The proportion of the total population under 15 years of age around 1950 ranged from 33.4 per cent in Barbados to 44.5 per cent in the Dominican Republic. All of the mainland countries had more than 40 per cent of their people in this economically dependent age group, except British

[4] United Nations, Department of Social Affairs, Population Division, *Population Growth and the Standard of Living in Under-Developed Countries* (ST/SOA/Series A. Population Studies, No. 20), New York, 1954, p. 7. This is a brief summary of relevant chapters of another publication: United Nations, Department of Social Affairs, Population Division, *The Determinants and Consequences of Population Trends* (ST/SOA/Series A, Population Studies, No. 17), New York, 1953. The latter not only summarizes the findings of hundreds of scientific writings on the subject, but presents an extensive bibliography. Both publications were drawn on heavily in writing this paper.

[5] Joseph J. Spengler, "Population Threatens Prosperity," *Harvard Business Review*, Vol. 34 (Jan.-Feb., 1956), pp. 85-94.

Honduras, where it was 38.4 per cent. By comparison, the proportion in the United States was only 26.9 per cent (Table 2).

A fact, not widely recognized, is that little change can be expected in present age structures as long as birth rates remain near their current levels, even though death rates fall. This is because declines in mortality result in more numerous survivors at all ages as long as fertility remains constant.[6] Consequently, problems created by increasing numbers of dependent children who constitute a continuing high proportion of the total population will plague Middle America for years to come.

One of the most significant of these is in education, which, if it does not precede, must at least accompany economic development, and is a fundamental condition for attainment of social equality. The present low levels of literacy among the adult populations of Middle America are a distinct handicap (Table 2). It is obvious that educational standards must be strengthened greatly if hoped for economic and social improvements are to be accomplished. Retention even of today's low standards, however, is difficult in the face of the high ratio of school-age children to adults, their rapid increase in numbers, and the low per capita income, which in no Middle American country greatly exceeds $300 per year.

When income is low, it is difficult to save much over what is required for mere subsistence of the workers and their families. Money, time and energy spent in rearing and educating dependent children, while an investment in human capital that will ultimately pay handsome dividends, is unavailable for immediate productive purposes, either of marketable goods or working equipment needed for economic growth. It is here that the problem of childhood dependency directly touches the second one faced by underdeveloped countries, namely, the shortage of capital.

The faster the population grows, the more capital investments are needed to maintain a constant level of per capita production. It has been estimated that if a country's population is growing 1 per cent per year, it must save and invest 2 to 5 per cent of its annual income in productive equipment just to continue a given living level. When it is remembered that Middle American populations are increasing not 1 per cent, but 2 to 4 per cent per year, and that the present low living levels must not only be maintained, but rapidly increased if the people's aspirations are satisfied, the magnitude of the problem becomes more apparent.

Provision of the huge capital inputs needed from internal savings will be difficult, if not impossible. Most of the people make little more than enough for a bare existence. The more fortunate ones too often use surplus wealth inefficiently, spend it for non-productive purposes, or invest it abroad. The obtaining of private capital from foreign sources is likewise not easy, because of the poor prospects for reasonable safety and for returns on investment which are commensurate with the risks involved.

This leaves loans and grants-in-aid from a richer foreign government, or from an international agency, as an essential condition for economic development, but in recent years Middle America has been relatively neglected in this regard. In the long run, however, foreign loans and gifts will serve only as "pump primers," and sound economic development must largely depend on investment out of internal savings.

The difficulty of increasing savings in Middle American countries is one aspect

[6] United Nations, *The Population of Central America (Including Mexico), 1950-1980, op. cit.*, pp. 20-21.

of a third problem they face. This is that the proportion of economically active persons who are employed in agriculture remains high, while the actual numbers so engaged has increased greatly with the rapid growth of population. This has raised the density of rural population on the cultivated land and has reduced, or at least slowed any increased productivity of agricultural labor. According to the most recent census, as much as 83 per cent of the labor force is employed in agriculture, as in Haiti and Honduras, and only in Puerto Rico, Barbados and Trinidad is the proportion below 40 per cent (Table 2). By contrast, only about 12 per cent of the workers in the United States and 19 per cent of those in Canada are in agriculture.

Natural Resources

Some argue that the relative importance of natural resources as a determinant of economic development is greatest in underdeveloped countries and tends to decline as an economy advances. If this is true, most Middle American countries face tremendous odds against making much progress along the road to a better life, because they are so poorly endowed with resources. Bacon has already pointed out the basic fallacy in the current thinking of many who assume that economic progress in less developed nations can simply follow the pattern established earlier in the United States and Northwestern Europe. Actually, "at no time in the history of the western world has the situation with regard to population and availability of natural resources been the same as that in today's less developed nations."[7]

In Middle America, except for the bauxite in Jamaica and the oil in Trinidad, significant resources of minerals and fossil fuels are known to be present only in Mexico. On this basis alone, disregarding its greater size and other favorable factors, Mexico has much greater possibilities than the other parts of the area for industrializing and otherwise expanding her economy.

Mexico has recently made phenomenal progress. During the 1939-1950 period, for example, Mexico's net domestic product grew 7.2 per cent annually, while population grew less than 3 per cent, providing over 4 per cent per year increase of real income per capita.[8] In spite of such gains the level of living of the great majority has only nominally improved, if at all, because of the savings, in effect enforced, which were necessary to provide needed capital. Actually, there are "various opinions to the effect that demographic congestion in urban areas, the impoverishment of the great rural masses, the high levels of unemployment and under-employment, the insufficiency of cultivated land to support the pressure of the heavy excess of farmers who annually go to swell the ranks of the population engaged in agriculture, the continual exodus of laborers in search of work abroad, and other economic and social disturbances" are symptoms of overpopulation in Mexico.[9]

Some may doubt this, but there are few who will question the presence of heavy population pressure in some of the other countries, for example, Barbados and Puerto Rico, which respectively had 544 and 261 inhabitants per square kilometer in 1958. Much less obvious, but probably none the less real, is its presence in countries having large expanses of thinly occupied land. Population densities at this extreme are Brit-

[7] Phillip Bacon, "Population Growth and Its Impact on Geographic Education, *The Journal of Geography*, Vol. 57 (March, 1958), p. 114.

[8] International Bank for Reconstruction and Development. *The Economic Development of Mexico*, Baltimore, 1953, pp. 3-18.

[9] Quotation in Robert S. Smith, "Population and Economic Development in Latin America," *The Southern Economic Journal*, Vol. XXIV (July, 1957), pp. 56-57, which was taken from Julio Duran Ochos, *Población*, Mexico (1955), pp. 262-265.

ish Honduras with 4, Nicaragua with 9, and Honduras and Mexico, each with 16 persons per square kilometer in 1958 (Table 1).

But gross population density is usually a poor index of over-population. A comparison between the number of people and the area under crops is much better, particularly if, as has already been pointed out is the case in Middle America, a large proportion of the labor force is engaged in agriculture. Calculation of this relationship shows a density range of from about 161 persons per square kilometer of arable land and land under tree crops in Nicaragua and Mexico, to 925 persons in Haiti (Table 2). The figure for the United States, 93 per square kilometer, is only a little over one-half as large as the smallest for any of the major political units of Middle America (except possibly British Honduras for which no estimate of crop land was available). Obviously, over crowding of farm lands in Middle America is already a fact, even in those countries which have a relatively low ratio of population to total land area, and it will get worse rapidly because of the high rate of population growth.

Some may say, after considering densities per square kilometer of crop land such as 839 in Barbados, 718 in Jamaica, or 701 in Puerto Rico, that there is still much room for population growth in some of the other countries without adding any more crop land. This is true, but it is also generally true that the higher the density becomes, the lower the production per agricultural worker, and therefore the lower his living level. Some reasons for this are that labor tends to become cheaper and farms smaller as agricultural workers increase. Where much land is owned by a few, as in parts of Middle America, the increased competition among workers for land to rent or for employment makes it easier for the landholder to take a bigger share of the profits through higher rents and lower wages. The introduction of labor saving machinery and techniques is discouraged. At the same time, the introduction of improved methods that would increase production without decreasing demand for labor, is commonly hindered by a peasantry who are illiterate, superstitious, and often suspicious of new and foreign techniques.

Why not cultivate more land to take care of the population growth? After all, the proportion of cropped land is as low as 5.5 or 6 per cent of total area in Costa Rica, Nicaragua, and Panama, and ranges from this up to 65 per cent in Barbados (Table 2). Davis has already pointed out that "one of the great myths about Latin America is that it contains huge open spaces that can easily absorb mass migration from a crowded world."[10] A corollary, would be that it is equally a myth that there is much space that can easily accommodate rapid internal increases of population. Too often area is confused with opportunity. Much of the land not used in Middle America is either unsuitable for farming or is so poor, inaccessible, or otherwise of such character as to require larger investments of capital and technical knowledge than are available. Then too, there is always the question of whether investments might be more profitably made in increasing production on land already used, or in starting industrialization.

Little is known, actually, about the qualities, location and amount of potentially usable land. The uniform surveys of relatively large areas, using standardized nomenclature and definition of classes of phenomena mapped, which are so basic to rational planning of resource use, are almost entirely lacking. The Rural Land Classification Program carried out in Puerto Rico provides an ex-

[10] Kingsley Davis, "Latin America's Multiplying Peoples," *Foreign Affairs*, Vol. XXV (1947), pp 643-654.

cellent model for surveys which should cover other parts of Middle America.[11] In making these, as well as in the planning following the inventories, the geographer can be of particular help and stands ready and willing, if called upon.

The dearth of knowledge concerning its qualities is one reason there is a lack of agreement on how to use the land in Middle America. In forested areas, Holdridge suggests a system of family operated plots involving shifting cultivation with tree crops replacing natural growth during the fallow period.[12] This is a variation of the *taungya* forestry system long advocated by colonial forestry officials in Southeast Asia. Gourou advocates production of food products in bottom lands and use of slopes and plateaus for tree crop plantations and for scientific silviculture. He would abolish shifting cultivation completely, and favors the extention of plantation agriculture because he feels modern techniques can be applied there best.[13] Jolly makes a case for development of mixed farming.[14] These are but three of the many ideas to emerge from the debate, but above all, there is a growing realization that agricultural techniques and precepts of the Middle Latitudes are not applicable without change to the tropical world.

Regardless of farming systems used, cash crops which can be traded abroad for badly needed man-made productive equipment and consumer goods, and for capital, must be produced if these countries are going to advance very far beyond a subsistence level of living. Today, however, there is much too great dependence in individual countries on one or two export crops. The trouble is, world capacity to produce coffee, bananas, cacao, cotton and cane sugar is greater than the ability of the markets to absorb them at good prices. Middle American producers compete in the market places not only with each other, but with producers in other parts of the world. Furthermore, it is not likely that future sales of the products named will expand fast enough to make much difference in the level of living of the rapidly growing Middle American populations. Extremely desirable, therefore, is a diversification of export-crop agriculture. Much needed also, is a widening of agricultural activities to produce import substitution crops which will save foreign exchange for use in purchasing capital goods.

Since import substitution is also obtained by industrialization and it is generally agreed that the establishment of manufacturing, in addition to increased foreign trade, is necessary for successful development of backward areas, the prospects for this in Middle America should be briefly reviewed. Besides the scarcity of capital, of mineral and power resources, and of workers trained in the necessary technical, clerical, and managerial skills, the small size of the political units should be listed as a significant obstacle. The smallness of the internal markets will tend to cause a proliferation of inefficient plants of uneconomical size, if each country attempts to industrialize. Certain types of manufacturing

[11] See Clarence F. Jones and Rafael Picó, *Symposium on the Geography of Puerto Rico*, University of Puerto Rico Press, Rio Piedras, P.R., 1955, and C. F. Jones and others, "The Rural Land Classification Program of Puerto Rico," *Northwestern University Studies in Geography*, No. 1, Evanston. Ill., 1952.

[12] Leslie R. Holdridge, "Ecological Indications of the Need For a New Approach to Tropical Land Use," *Symposia Inter-Americana*, No. 1 September, 1959, Turrialba, Costa Rica, pp. 1-12. There are also "Comments" by seven other writers, including the author of this paper.

[13] Pierre Gourou, "The Quality of Land Use of Tropical Cultivators," *Man's Role in Changing the Face of the Earth*, University of Chicago Press, Chicago, 1956, pp. 336-349; and Pierre Gourou, *The Tropical World* (translated by E. D. Laborde), Longmans, Green and Co., London, 1953.

[14] A. L. Jolly, "Mixed Farming in the Tropics," *Turrialba*, Vol. 8 (April-June, 1958), Turrialba, Costa Rica, pp. 52-54.

will be prevented entirely; the kind where a very large number of units must be mass-produced and sold before operations are profitable.

The enlarging of the market to support industries that would be uneconomical when dependent on sales in a single country, is likely to be the greatest single benefit if recent moves towards economic integration eventually lead to a Central American common market.[15] The elimination of barriers to the free movement of goods, people and capital within the area should have other benefits. Some are greater regional specialization, increased trade between the units, and larger bargaining power in international economic conferences and agreements, as is illustrated by the advantages accruing to the recently created West Indian Federation.

In closing, it should be stressed that a reasonable solution of most of the economic and social development problems of Middle America is not impossible. The deciding factor will be man himself, for within the outer limits set by nature, the relative limits of attainment are set by culture, human attitudes and actions. Progress in Middle America is being made, but not fast enough. It is difficult to escape the conclusion that the chances of ultimate success would be infinitely better if population growth were much less rapid.

Penrose has written, "short-run overpopulation may be said to exist in a country poorly endowed with fixed natural resources per head of population, where the growth of population is running parallel with or ahead of the growth of production; where natural resources yielding products in demand abroad are shrinking or failing to expand; where the economic prospects of future development are not attracting skill and loan funds from abroad, the advantages of low wages being offset by unfavorable geographic conditions; and where would-be emigrants are not in demand or cannot meet the costs of transport in sufficient numbers to affect the growth of population significantly."[16] Judged by these tests, much of Middle America is presently over-populated and thus a "Land of Too Many and Too Little."

[15] Dr. Bert F. Hoselitz, University of Chicago, has discussed prospects for economic integration in "Economic Development in Central America," *Weltwirtschaftliches Arhiv*, Vol. 76 (1956), pp. 267-308, and mentions this also in "Patterns of Economic Growth," *Canadian Journal of Economics*, Vol. 21 (November, 1955), pp. 417-20. Progress is being made as evidenced by a new Treaty of Economic Association between Guatemala, El Salvador, and Honduras concluded in January, 1960, and the fact that the United States will loan millions to a new Central American bank for economic integration. See Federal Reserve Bank of New York, "The Emerging Common Markets in Latin America," *Monthly Review*, Vol. 42, No. 9 (September, 1960), pp. 154-160.

[16] T. F. Penrose, "Malthus and the Underdeveloped Areas," *Economic Journal*, Vol. 67 (June, 1957), p. 236.

RAILROADS AND WATERWAYS OF AFRICA

BARBARA A. YATES
U.S. Information Agency

AFRICA, one-fifth of the world's land surface, and four times the area of the United States, is a land of physical superlatives. Here are two of the world's mightiest river systems, the Nile and the Congo, some of the highest mountains and steepest escarpments, some of the largest and deepest lakes, and the most extensive, inadequately mapped deserts, savannas and rain forests.

The great challenge facing the countries of Africa today is how to tap the

continent's rich mineral and agricultural resources, despite the formidable physical (as well as economic and social) obstacles, in order to build stable, expanding economies.

Most authorities seem to agree that the economic growth of Africa will be dependent upon the prior development of an adequate transport system, especially upon the creation of coordinated transcontinental rail routes. The exploitation of mineral and agricultural resources and the establishment of overhead capital or economic infrastructure is almost entirely dependent upon the existence of transport, as is any sort of industrial development.

Transport in Africa is mainly concerned with the moving of bulky commodities and exports over long distances. While waterways are still the cheapest means of transport, they are inflexible and in Africa, because of the physical terrain, beset with unnavigable sections. Railways, while more expensive to construct and maintain, remain, none-theless, more flexible in location and amiable to expansion. Men associated with African development as far back as Henry Stanley[1] have seen railroads as the most important means of transport in Africa. Even with the present extensive program of road construction, major reliance for local commerce and development in the foreseeable future will be upon the railways.[2]

This paper will deal with the southern, eastern, central and northeastern regions of Africa,[3] including Egypt, because of her strategic position astride the Nile. This region comprises more than six million square miles, 52 per cent of the continent, and contains the only transcontinental rail and water routes.

History of Railway Development

The "railroad era" began in Africa just after the partition of the continent by the European powers. The Berlin Conference of 1884-1885 stated that lands claimed by European nations in Africa must be occupied to establish possession.[4] The building of a railway was considered evidence of intent to colonize.

The result was a rush of railway construction from 1890-1914, largely unplanned, employing a variety of gauges, with no thought given to trans-continental coordination. Political and strategic forces were far more important in determining the direction of lines than economic factors. However, as the demarcation of the European colonies became accepted, economic factors, primarily the discovery of minerals, began to replace political ones.

In Egypt and the Union of South Africa railroad construction had begun earlier, the latter motivated by the discovery of diamonds and gold in the interior.

All continents have had their great railway "romances." As America had her trans-continental link, so Africa had Cecil Rhodes' dream of a great railway to link all British interests in the eastern half of the continent, from Cairo to Capetown. His dream was never realized, but upon his death at the beginning of the 20th century, the railway had pushed 1,500 miles north to the Congo border, and by 1931, the final section of the first, and still the only, trans-continental rail

[1] L. Dudley Samp, *Africa, A Study in Tropical Development*, John Wiley & Sons, Inc., New York, 1953, p. 188.

[2] *Ibid.*, p. 195.

[3] Southern Africa: Mozambique, Rhodesias, Nyasaland, Bechuanaland, Basutoland, Swaziland, Union of South Africa, South West Africa and Angola. Eastern and Central: Kenya, Uganda, Tanganyika, the Republic of the Congo (former Belgian Congo), and Ruanda-Urundi. Northeastern: Sudan, Eritrea, French Somaliland, United Somali Republic (formerly British Somaliland and Italian-administered Somalia), and Ethiopia.

[4] S. E. Crowe, *The Berlin West African Conference, 1884-1885*, Longmans, Green & Co., New York, 1942, pp. 176-182.

TABLE I[5]

Country	Total Rail Route Miles 1959	Ratio Total Rail Miles/ 1,000 sq. mi.	Total Miles Inland Waterways 1959	Ratio Total Water/Rail Miles/1,000 sq. mi.
Egypt	3,988	8.7	915	10.7
Sudan	2,480	2.5	2,320	4.9
Eritrea	191	4.2	none	4.2
Ethiopia	421	1.0	none	1.0
French Somaliland	66	8.3	none	8.3
Somali	none	—	none	—
Kenya	1,293	5.8		15.2[7]
Uganda	533	5.7	6,311[6]	28.0[7]
Tanganyika	1,572	4.3		10.1[7]
Northern Rhodesia	644	2.2	none	2.2
Southern Rhodesia	1,692	11.3	none	11.3
Bechuanaland	399	1.5	none	1.5
Nyasaland	316	6.4	700	20.7
Mozambique	1,744	5.9	none	5.9
Union of South Africa	11,976	25.4	none	25.4
Basutoland	1	—	none	—
Swaziland	none	—	none	—
South West Africa	1,463	4.6	none	4.6
Angola	1,705	3.5	none	3.5
Congo	3,125	3.5	8,400	12.7
Ruanda-Urundi	none	—	none	—
TOTALS	33,609		18,646	

[5] Sources: *Sudan Almanac 1959*, "East African Railways and Harbours," *Annual Report 1958*, "Rhodesian Railways," *Report of the General Manager, 1958*, "Union of South Africa," *Report of the General Manager of Railways and Harbours for the Year Ended 31 March 1959*, *Year Book and Guide to East Africa, 1959*, *Year Book and Guide to Southern Africa, 1959*, *Overseas Railways 1959*, and *World Railways 1958–59*, Purnell and Sons, Ltd., London, 1959.

[6] This is a total for all three territories of British East Africa on Lake Victoria—Tanganyika, Kioga, Albert, and the Albert Nile.

[7] The total of 6,311 route miles has been evenly pro-rated between the three territories to ascertain their rail-waterway route ratios.

link had been laid from Angola to east coast ports.

Present Transport Pattern

Railway maps of Africa are notable for their emptiness. This is not quite as true for the eastern and southern half of the continent as it is for the northeastern and the western regions (Figs. 1, 2 and 3).

In the southern, eastern and northeastern half of the continent there are over 33,000 route-miles of railway (Table I). This is an average route density ratio of 5.5 miles for every 1,000 square miles. This density ratio compares with 45 miles of track per 1,000 square miles in the United States. Even if the 18,646 miles of navigable waterways were added, this would only give a total rail-waterway route-density ratio of less than nine miles.

One must remember that these transport ratios are averages, for there are many sections of this half of the continent where the ratio is much less. A notable instance is northeastern Africa, seven per cent of the continent, where there are no navigable waterways and only two short rail lines giving a route-density ratio of less than one mile per 1,000 square miles.

The Republic of the Congo is probably the most intensely developed country in tropical Africa and possesses the best integrated transportation system outside the Union of South Africa. But, even with her 11,500 route miles of railways and navigable waterways, there are still

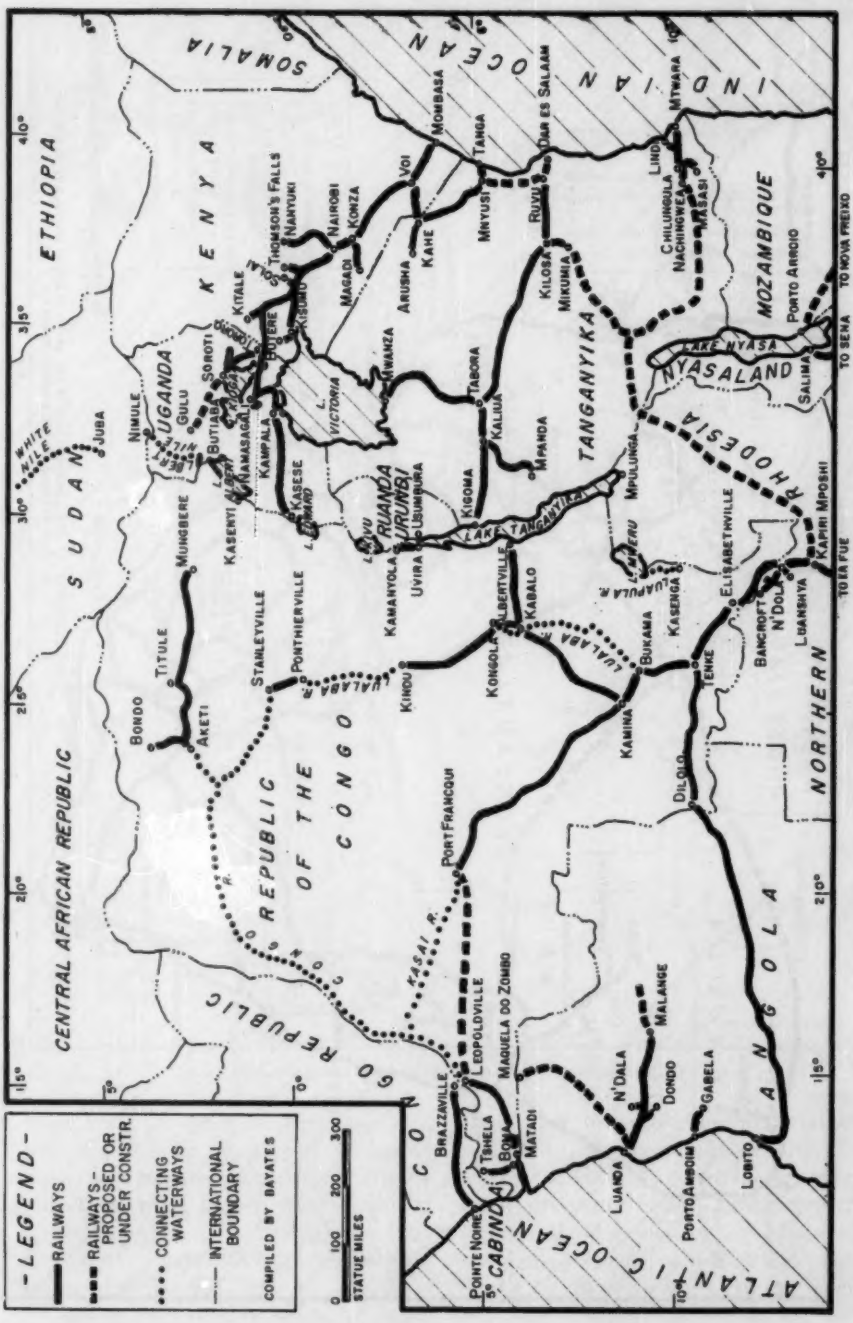

FIG. 1. Railways and connecting waterways: East and Central Africa.

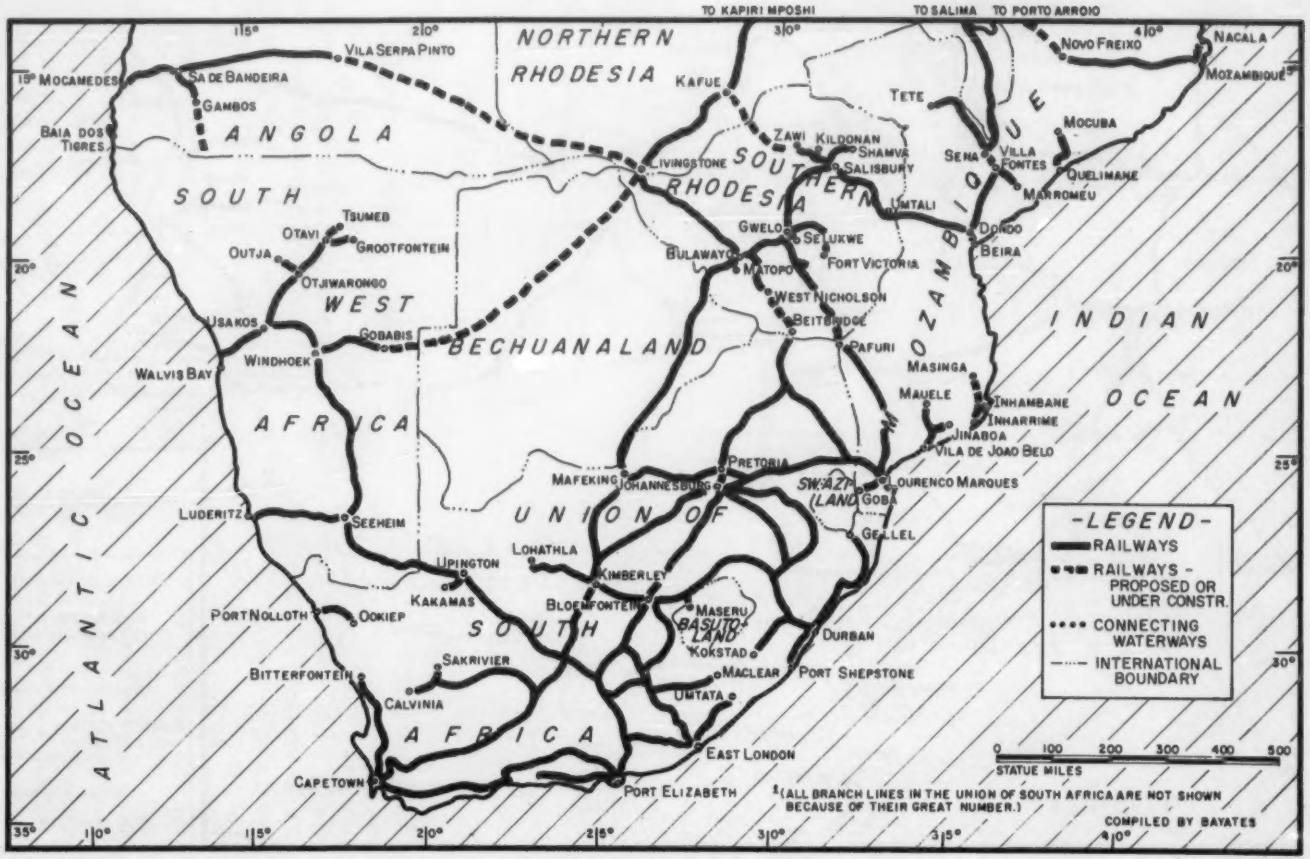

FIG. 2. Railways and connecting waterways: Southern Africa

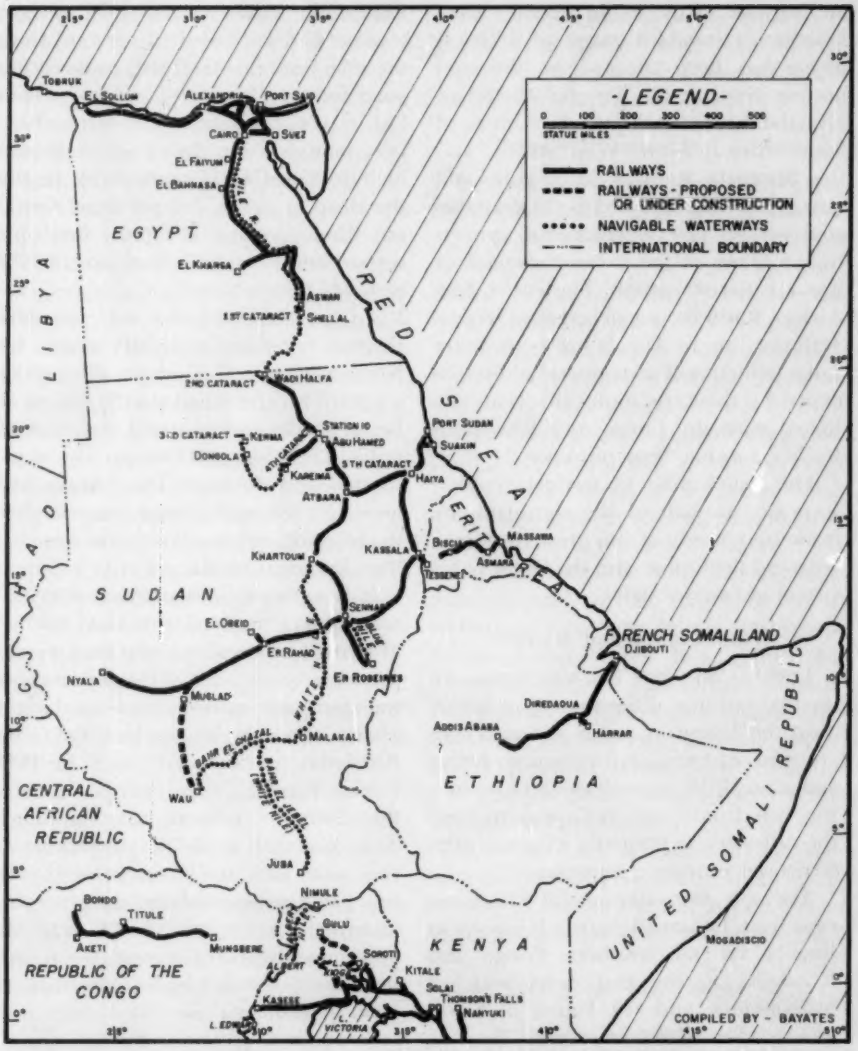

FIG. 3. Railways and connecting waterways: Northeastern Africa.

large areas far from existing transport. Angola (3.5 route miles per 1,000 square miles) and Northern Rhodesia (2.2 route miles per 1,000 square miles) still lag far behind the regional ratio, especially for large, potentially rich, European-managed territories.

Only in the Union of South Africa do railways follow the western pattern of connecting urban, agricultural, mining and industrial centers and seaports. Elsewhere, the main characteristic is a single track stretching inland connecting the interior with a seaport, or connecting navigable stretches of inland waterways. There are few branch lines of any length and even fewer connecting lines.

There are five different gauges in use

on African railways. In recent years, however, a standard gauge of 3 feet 6 inches has been adopted on the connecting lines in the Congo, Rhodesias, Nyasaland, Mozambique, the Union of South Africa, South West Africa, and the Benguela Railway in Angola, and now it has been accepted as the desirable goal for all new international connections.[8] Many of the isolated sections of line are narrow gauge. The entire East African Railways system and the Luanda-Malange line in Angola are both meter gauge which will necessitate additional expense if these two routes are eventually linked with the Congo and Rhodesian Railways as has been proposed.

The 18,646 miles of navigable waterways in this half of the continent are made up entirely of two great rivers, the Nile and the Congo, and the Great Lakes system of eastern Africa.

Trans-Continental Routes

There is only one east-west trans-continental rail line, other than those which cross the Union of South Africa. There are two east-west rail-waterway routes and, since 1956, a north-south rail-waterway link from Cairo to Capetown. Only the rail route is presently of great inter-territorial economic importance.

The sole trans-continental rail route runs from Lobito (Benguela Railway) in Angola via the southern Congo and Rhodesias to the east coast ports of Mozambique and the Union of South Africa. Restrictive measures by the former Belgian Congo and Rhodesias have kept traffic initially low. These restrictions have been somewhat relaxed in recent years, and freight traffic increased to 2.6 million tons in 1956 on the Benguela section, 80 per cent being transit shipments for the Congo and Rhodesias.[9] However, by 1958, freight tonnage had decreased 10 per cent from the 1956 peak due to greatly reduced imports for the Congo following a sudden fall in world copper prices. Mineral export tonnage from the Congo remained high in 1958 (416,575 metric tons), despite this drop in prices. Copper from Northern Rhodesia, carried for the first time toward Lobito in 1957, increased in 1958 to 47,218 metric tons.[10]

To go westward on this trans-continental rail route is slightly shorter for Northern Rhodesian copper than going eastward on the Rhodesian Railways to Beira, besides saving several thousand sea miles. The route to Lobito is also much shorter and involves fewer trans-shipments for southern Congo minerals than the laborious rail-water national route via Port Francqui to Matadi.

It is extremely unfortunate that this one trans-continental rail link has not been used to anywhere near its capacity, particularly since one of the greatest post-war transport problems has been the congestion of moving copper and coal in the Rhodesias to east coast ports. In 1957, Lobito handled only 18.7 per cent of the Congo's international shipping.[11] The increased economic significance of this route with the recent relaxation of restrictive measures should be great, but meaningful evaluation should await several more years of operation so that permanent trends can be differentiated from phenomena associated with periodic external economic fluctuations.

Lake Tanganyika forms the only bar-

[8] Central and Southern Africa Transport Conference, *Final Acts and Related Documents*, Johannesburg, 1950, p. 31.

[9] William A. Hance, *African Economic Development*, Harper and Brothers for the Council on Foreign Relations, New York, 1958, p. 115.

[10] A. Bandeira, "The Benguela Railways," *Overseas Railways 1959*, Railway Gazette Publication, Tothill Press, Ltd., London, 1960, pp. 93-96.

[11] Office de l'Information et des Relations Publiques pour le Congo Belge et le Ruanda-Urundi, *L'Economie du Congo Belge et du Ruanda-Urundi*, Bruxelles, 1958, pp. 53-54.

rier to a second east-west trans-continental rail route from Lobito or Matadi to Dar es Salaam. Traffic from the Congo to Dar es Salaam has been small (2.1 per cent of the Congo's international shipping in 1957),[12] although it has steadily increased in volume in recent years.

An alternate routing from Matadi via rail from Kindu in the eastern Congo to east coast ports forms a second trans-continental rail-waterway route. But in 1957, the port of Beira handled only 2.9 per cent of Congo international trade.[13]

With the completion in 1956 of the Kamina-Kabalo rail link in the Congo, there is now a north-south rail-waterway connection from Cairo to Capetown.[14] This route, however, has little international economic significance.[15]

There is an extension of the main Egyptian railways from Suez across the Sinai Peninsula connecting the African continent with the Middle East and Europe, making it physically possible to go overland from Europe by rail and inland waterway to Capetown. Service is now disrupted at the Egyptian-Israeli frontier.

It should not be presumed that any of these trans-continental routes provides rapid transports. The single rail route takes seven days from coast to coast; Lobito to Dar es Salaam more than eight days; and Matadi to Dar es Salaam or Beira more than two weeks. Even from the southern Congo and Northern Rhodesia three or four days are required to reach either coast, while the shorter routes which cross the Union of South Africa require three to five days.

Proposed Continental Links

Perhaps one of the most important continental links proposed is one to connect the Rhodesian and East African Railway systems. A survey[16] was conducted in the early Fifties with regard to a 1,100-mile link from Masimba on the Tanganyika Central Line to Kapiri Mposhi in Northern Rhodesia. The conclusion was that the project was feasible from an engineering standpoint, but that capital costs, estimated at not less than $56 million,[17] would be prohibitive until there was greater settlement and economic production along the route.

For many years the possibility has been discussed and surveys conducted for a connecting line between the Rhodesian Railways and Walvis Bay, giving the Rhodesias access to an alternate seaport, and creating a second trans-continental rail route. The new rail link would begin near Livingstone in Southern Rhodesia and join the South West African Railway system near Gobabis. The high cost of this stretch, estimated in 1953 at $70 million,[18] through relatively uninhabited country (although the soil is said to be highly fertile), has so far proved prohibitive.

The Portuguese government has em-

[12] *Ibid.*, p. 53-54.

[13] *Ibid.*, p. 53.

[14] Rail from Cairo to Shellal, Egypt; steamer to Wadi Halfa, Sudan; rail to Khartoum and Kosti; steamer to Juba; railway bus from Juba 122 miles to Nimule on the Uganda border; combination steamer-rail to Kampala; Lake Victoria steamer to Mwanza; rail to Kigoma; steamer to Albertville; and rail through southern Congo and Rhodesias to Capetown—a trip of at least five weeks.

[15] When the author made the international connection at Nimule in 1960, she was the sole international passenger and her two suitcases were almost the entire international freight.

[16] *A Development Survey for the Central African Rail Link*, addressed to the Secretary of State for Colonies by Sir Alexander Gibb and Partners, London, and Overseas Consultants, Inc., New York, Vol. II, New York, October 1, 1952. Also, East African Railways and Harbours, *A Report on an Engineering Survey of a Rail Link Between the East African and Rhodesian Railway Systems*, Government Printer, Nairobi, June, 1952.

[17] Lord Hailey, *An African Survey* (Revised 1956), Oxford University Press, London, 1957, p. 1559.

[18] *Manchester Guardian Weekly* (October 1, 1953), 20.

barked on a large development scheme in Angola involving three railway extensions.

Under construction is a connection between the Moçamêdes Railway at Sà de Bandeira and the Rhodesian Railways near Livingstone, which would form a third trans-continental rail route. The existing section of line is being converted to 3′ 6″ gauge and by the end of 1958 the new line had reached Vila Serpa Pinto.[19] Moçamêdes has an excellent newly-developed port which will help relieve congestion on the Rhodesian Railway and at Beira. Eventually, it is planned to connect the southern branch of this line, now reaching as far as Gambos, with the South West African border near Namacude.[20]

The Luanda-Malange meter-gauge line is being enlarged to 3′ 6″ gauge and extended as far as the Liu River. It may eventually be connected with the B. C. K. Railway in the Congo.[21] A northern branch from this line, to be called the Congo Railway, was begun in 1956. It will go northeast as far as Damba, and then swing northwest to Maquela do Zombo on the Congo border just south of Matadi.[22]

Two other plans for railway extension would help relieve the pressure on Beira. To the north of Mozambique, the new Nacala-Nova Freixo line is scheduled to be continued to Porto Arroio on Lake Nyasa,[23] giving Nyasaland a new exit to the sea. An extension of the Southern Province Line in Tanganyika to Lake Nyasa through the Ruhuhu coal area has been proposed, and would give Nyasaland access to the new deep-water port of Mtwara which is not used to capacity.

[19] James Duffy, *Portuguese Africa*, Harvard University Press, Cambridge, 1959, p. 348.

[20] Alfred Gordon-Brown (Ed.), *Year Book and Guide to Southern Africa, 1959*, Robert Hale, Ltd., London, 1959, p. 322.

[21] Duffy, *op. cit.*, p. 348.

[22] Alfred Gordon-Brown (Ed.). *op. cit.*, p. 322.

[23] Hance, *op. cit.*, p. 114.

A rail extension, begun in 1955, into western Sudan and the eastward extension of the Nigerian Railway, now under construction to Maiduguri on the Niger-Chad border, lack only some 800 miles of joining and if finished would form the first trans-continental link between West Africa and the Nile basin. This connection must be made sometime in the future if the vast interior area of Chad and the Central African Republic (formerly Ubangi-Shari in French Equatorial Africa), long isolated from modern communication, is to be developed.

Congestion Major Problem

There has been an estimated 200-300 per cent increase in net ton-miles of railway traffic in this region in the last twenty years. It is no wonder that overcrowding of existing facilities has been the most persistent post-war transport problem.

The Rhodesias, the area of major congestion and the region showing the most capacity for current and projected industrial growth (outside the Union of South Africa), were in greatest need of additional routes to relieve overdependence on the port of Beira. Although hauling capacity has been doubled since World War II, the Rhodesian Railways are still finding it difficult to keep up with traffic which has doubled in the past ten years, totaling over 11 million tons in the year ending 30 June, 1958.[24] This congestion during its peak in 1956, resulted in temporary shutdowns of copper mining, stockpiling of ores, and such severe congestion at Beira that ships were laying at anchor as many as 120 days awaiting berthing space.[25]

By 1958, the congestion problem was greatly relieved in terms of current traffic due mainly to the addition in 1955 of

[24] Rhodesian Railways, *Report of the General Manager, 30 June 1958*, General Manager's Office, Bulawayo, February 6, 1959, p. 6.

[25] Hance, *op. cit.*, p. 145.

a line from Southern Rhodesia to Lourenço Marques. In 1958, the new rail line was carrying 1.4 million tons of traffic, an increase of 84 per cent over the previous year.[26] This was largely freight diverted from Beira which still continued to handle more than two million tons in 1958, although this represented a 4 per cent decrease in traffic from the previous year (3,258,376 tons in 1957 to 2,727,702 tons in 1958).[27] In 1959, total freight traffic on the Rhodesian Railways decreased for the first time in twenty years to 10.5 million tons. This was primarily due to a decrease in general goods traffic accentuated by a prolonged strike in the copper mines late in 1958.[28]

Thus, due to the combined efforts of the Mozambique and Rhodesian governments, there has been no serious congestion at Beira in the last three years; the clearance of goods has proceeded smoothly. This was also a result of Rhodesian copper, for the first time in 1957, being exported over the Benguela Railway to Lobito. After the Bulawayo Conference, it was agreed to release Rhodesian copper producers from long-standing commitments to use the Rhodesian Railways to the east coast.[29]

This persistent problem of congestion was the main reason for the new Bulawayo-Lourenço Marques line, and is largely behind the proposed routes to Beitbridge, Walvis Bay and Moçamedes. In no other region of Africa is additional trans-continental transport so needed, either currently or in the near future.

Congestion has also been a problem for the East African Railways, for traffic has increased three-fold on the Kenya-Uganda Railway and six-fold on the Tanganyika Railways since 1938. The latter system created severe congestion along the route and at the port of Dar es Salaam during 1956 and 1957. Strenuous efforts to increase the rolling stock, improve the roadbeds and track, and ameliorate the harbor facilities have resulted in great improvement. There have been few instances of serious congestion in 1958, even though rail ton-mileage was at a record high. The East African Railways and Harbours Administration would like to concentrate on long-haul facilities, but lack of adequate capital has been, and will continue to be, a major obstacle and has caused plans for further construction to be temporarily abandoned.[30]

The threat of imminent congestion is still present on the Rhodesian and East African Railways in spite of the improvement in 1958 and 1959, which largely represented good planning and external economic fluctuations rather than adequate capacity.

Other Problems

By glancing at any topographical map one readily sees that eastern and southern Africa are areas of narrow coastal plains (averaging only twenty miles in width) and sheer escarpments rising to high plateaus. Rivers plunge down these scarps barring ocean-going vessels from penetrating into the interior. The north-south configuration of most of the valleys, especially the Great Rift fault in eastern Africa, makes transcontinental railway gradients high, reaching 28 feet per thousand on the Djibouti-Addis Ababa line, and up to 25 feet per thousand on the Benguela Railway.

The huge mass of the continent in relation to its coastline has resulted in railways having to cross long stretches of

[26] Rhodesian Railways, *op. cit.*, pp. 25-26.

[27] Great Britain, Colonial Office, Nyasaland, *Report for the Year 1958*, HMSO, London, (1959), 127.

[28] J. W. S. Pegrum (General Manager), "Rhodesian Railways," *Overseas Railways 1959*, pp. 111-112.

[29] A. Bandeira, *op. cit.*, p. 93.

[30] East African Railways and Harbours" *Annual Report 1958*, Government Printer, Nairobi (1959), 1, 6, and 15.

relatively unpopulated and marginally productive land.

Climate plays an important part in African transport. The high temperatures of the desert areas create a shortage of water. The erratic rainfall and the high humidity in the equatorial areas seriously erode roadbeds and cause unusually rapid deterioration, making construction and maintenance difficult and costly. Floating water hyacinth (*Pistia stratiotes*) on the Nile and overhanging vegetation on Congo tributaries impede navigation.

Lack of suitable local fuels has been one of the major problems and another factor is increasing operation costs. Only the Rhodesias and Mozambique produce enough coal for the needs of their railways, although coal deposits in Tanganyika, Northern Rhodesia, Angola and Bechuanaland may yield suitable fuel in the future. Many railways have switched to expensive imported diesel fuel, but known petroleum resources in this part of Africa hold little promise for the future. Because of the lack of good grade domestic coal, some railways are burning wood—expensive, scarce and time consuming to cut and load—or low-grade coal which makes maintenance costs even higher.

Most railways in Africa have been concentrating on improving their rolling stock, roadbeds, track and bridge capacities. They have been replacing the antiquated legacy of the inter-war years which created a major problem after World War II when traffic soared.

Good management and technical skills are frequently in short supply. As more African countries attain independence, accompanied by the exodus of European technicians, this problem will become even more acute.

Capital, operating, and maintenance costs have always been comparatively high. The recent Bulawayo-Lourenço Marques line cost $61,000 a mile exclusive of bridges;[31] the Kampala-Kasese line $69,000, and the Kilosa-Mikumi line $51,000 per mile.[32] Most African railways are government owned and financed. With projects in education, social welfare, health and industry competing for limited government budgets, together with the gap in technical and managerial skills, it is a serious question whether even the existing rail and waterway networks can be maintained by the new African nations without international assistance.

Survey of Rail and Waterway Systems

In order to better understand the present transport pattern, the difficulties and the possibilities for future transport development, a more detailed country-by-country study follows.

The Nile Basin. For over 2,500 miles from Cairo south through Egypt and the Sudan, there is little else than the Nile, a great artery of communication, and the longest river in the world (4160 miles).

Going south, the Nile is navigable from Cairo to the first cataract at Aswan. From Shellal, twelve miles south, to Wadi Halfa, on the Sudanese border, the Nile is the sole means of transport other than camel caravans. Steamers of the Sudan Railways maintain a semi-weekly service to Wadi Halfa, where navigation is again impeded by a series of five cataracts until Khartoum is reached. Here, the main line of the Sudan Railways meets the steamers, and transports goods and passengers across the desert to Port Sudan, Khartoum and as far west as Nyala.

From Khartoum to Juba, the river (now the White Nile), is again navigable. The Sudan Railways operate three stern-wheel steamers (a journey of eight to eleven days), and the sole means of surface

[31] Lord Hailey, *op. cit.*, p. 1596.

[32] East African Railways and Harbours, *Estimates of Expenditures on Capital, Betterment and Renewal Works 1959: Railways*, Government Printer, Nairobi, 1958, p. 11.

transport between Khartoum, the capital, and the cotton-producing southern Sudan. These steamers have connecting schedules with the Uganda steamer on the Albert Nile at Nimule. However, little international river traffic crosses the frontier. Instead, freight moves north by steamer to Kosti where it is carried to the coast on the Sennar-Port Sudan rail line.

Three additional short steamer routes are maintained: (1) from Malakal to Wau during the flood season only; (2) from Sennar to Er Roseires near the Ethiopian border on the Blue Nile; and (3) between Kerma and Kereima in the north. The latter is connected by a short rail line with Station 10 on the main Wadi Halfa-Sennar line. Freight moving south from this region is exported on the branch rail line from Atbara to Port Sudan.

The Sudan Railways (including steamer services) carried 1.9 million tons of paying freight in the year ending June 30, 1959. The major railway construction underway is an extension of the western line from El Obeid toward the Chad border, having reached Nyala ahead of schedule in 1959. The first 18 miles (to Buglad) of a proposed extension to Wau were also completed in 1959.[33]

Northeast Africa. In northeast Africa there are only two short railway lines which total less than 700 miles. The longest, the Franco-Ethiopian Railway, runs from the Red Sea port of Djibouti 6,000 feet up the scarp to Addis Ababa on the Ethiopian plateau. In Eritrea, the second line runs from Massawa through Asmara to Biscia.

There are neither railways nor waterways in the former British Protectorate of Somaliland (now part of the United Somali Republic). In the former Italian-administered Somaliland there are two rivers, the Juba and the Webbe Shibeli, which are said to be navigable for more than 400 miles by small steamers. However, neither are presently used.[34] Prior to World War II, a short rail line went inland from Mogadiscio, but this was dismantled and the track carried away for military use during the war.

British East Africa. The East African Railways and Harbours Administration operates 3,398 route miles of meter-guage track, and 6,311 route miles on the Great Lakes of Victoria, Kioga and the Albert Nile, inland waterways of the three territories, and on Lakes Tanganyika and Albert shared with the Congo and Northern Rhodesia. Total rail traffic was 5,458,000 tons in 1958, a two-and-a-half per cent increase over the previous year.[35]

The main Kenya-Uganda line is now 1,081 miles, a journey of 41 hours, from Mombasa to Kasese. The last 209 miles to Kasese were added in 1956, to serve the Kilembe Copper mine and the tea and coffee estates of the Toro area.

Freight carried from Mombasa in 1958, decreased following a general decline in imports, which was attributed to increased domestic industrial production.[36] This trend will probably become more pronounced in the future, making internal rail traffic more and more important.[37]

From the main Mombasa-Kasese Line there are 745 miles of branch lines, including a connection from Voi with the Tanga Line in northern Tanganyika.

The three lines of the Tanganyika Railways all move inland from her principal ports. The northernmost, the

[33] Abu Bahr Ali Rida, "Sudan Railways," *Overseas Railways 1959*, p. 120.

[34] International Bank for Reconstruction and Development, *The Economy of the Trust Territory of Somaliland*, Washington, 1957, p. 39.

[35] "East African Railways and Harbours," *Annual Report 1958*, 58.

[36] Great Britain, Colonial Office, *Annual Report on the East African High Commission, 1958, HSMO, London* (1959), 13.

[37] East African Railways and Harbours," *Annual Report 1958, op. cit.*, 15.

Tanga Line, serving the sisal and coffee estates of northern Tanganyika, extends 273 miles inland to Arusha.

The Tanganyika Central Line, following an old slave caravan route from Dares Salaam to Kigoma (780 miles), is part of the trans-continental rail-waterway routes from Lobito and Matadi. This main line now has two long branches: one from Tabora to Mwanza connects Tanganyika with Uganda and Kenya ports on Lake Victoria, and the other is a line to the lead mines at Mpanda.

The Southern Province Line, built in connection with the ill-fated Groundnut Scheme, runs from Tanganyika's only deep-water harbor, Mtwara, 132 miles inland to Nachingwea. A new section from Chilungula to Masasi (24 miles) was added in November, 1958.

Preliminary studies were made in 1958 and 1959, for four railway extensions: (1) from Mikumi south through the Kilomboro Valley and the Southern Highland to connect with the Southern Province Line and eventually the Rhodesias; (2) for the Bukonte/Jinji cut-off to shorten the main line to Kampala by 50 miles (construction began in 1959); (3) for a northern extension from Soroti to Gulu in Uganda; and, perhaps most important, (4) a link between the Kenya-Uganda Line and the Tanganyika Central Line from Mnyusi to Ruvu.[38]

Great Lakes System. Lakes Victoria, Kioga, and the Albert Nile are essentially inland waterways for the three territories of British East Africa. With Lakes Albert, Kivu, Tanganyika, Mweru, and Nyasa, they form a vast system of water transport between east and west Africa. Since most railways run east-west, the lake system forms the main north-south continental linking. With the exception of the Congo and the Nile, and in West Africa the Gambia and the Niger, internal water transport in Africa is confined mainly to the Great Lakes.

Steamers, tugs and lighters of the East African Railways and Harbours, the Congo railways, and the Nyasaland Railways operate 7,818 route miles on the Great Lakes. Total freight traffic hauled by the East African Railways and Harbours fleet on the Great Lakes increased eight per cent in 1958, totaling 357,000 tons over 6,311 route miles.[39] The Congo operates 807 route miles of steamer services on Lakes Kivu, Tanganyika, Albert and Mweru. In 1956, Congo lake fleets hauled 404,900 tons of freight on Lakes Tanganyika and Kivu.[40] Vessels of the Nyasaland Railways carried 16,021 tons over 700 route miles on Lake Nyasa in 1958.[41]

Lake Victoria is the most important of the African Great Lakes and second largest fresh water lake in the world. An inland waterway for the British East African territories, it accounted for 60 per cent of all Great Lakes' route miles and more than 30 per cent of all traffic in recent years. Lake Tanganyika, next in importance, accounted for over 40 per cent of all Great Lakes' traffic, hauled mainly by the Congo fleet.

Traffic on Lake Nyasa has always been low, primarily because of shifts in the level of the lake, as much as twenty feet, and violent storms. Improvement should result from a bund being constructed on the Upper Shire River, the southern outlet of the Lake.

Rhodesias, Nyasaland and Bechuanaland. In addition to international connections to Beira, Lourenço Marques,

[38] J. R. Farquharson (General Manager), "East African Railways and Harbours," *Overseas Railways 1959*, p. 102.

[39] "East African Railways and Harbours," *Annual Report 1958*, 12: Lake Victoria 246,000 tons; Kioga 72,000 tons; Tanganyika 7,000 tons; and Lake Albert and the Albert Nile 32,000 tons.

[40] Office de L'Information et des Relations Publiques pour le Congo Belge et le Ruanda-Urundi, *op. cit.*, p. 56. Lake Kivu 83,700 tons; and Lake Tanganyika 321,200 tons.

[41] H. W. Stevens, "Nyasaland and Trans-Zambesia Railways," *Overseas Railways 1959*, p. 108.

Johannesburg, the Congo and Lobito, there are several hundred miles of branch lines transporting agricultural produce to urban centers in Southern Rhodesia, as well as short sections bringing copper and coal from the mines in Northern Rhodesia to the main rail line near the Congo border.

A project has been proposed to construct a line (Kafue-Sinoia) connecting the two capitals of the Rhodesias—Lusaka in the north and Salisbury in the south—thereby saving 514 miles presently required over the circuitous route via Livingstone. This would also reduce the distance of the Copper Belt from east coast ports. Various other proposals to relieve the congestion have been discussed earlier.

One 3′ 6″ gauge line, the Nyasaland and Trans-Zambesia Railways, connects Salima, near the lake port of Chipoka, with Beira, making this latter seaport Nyasaland's sole outlet to international shipping. The Zambesi River is spanned along the route by a bridge said to be the longest railway bridge (12,064 feet) in the world.[42]

Traffic, since 1939, has increased fivefold to a total of 1,298,906 short tons in 1958, over both the Nyasaland and Mozambique sections of the route (805,058 short tons on the Nyasaland and 493,848 short tons on the Mozambique section).[43] Additional rail connections with the port of Tanga in Tanganyika and Nacala in Mozambique have been proposed.

Mozambique (Portuguese East Africa). Railway development in Mozambique has largely been determined by the needs of Rhodesia, Nyasaland, the Transvaal Province of the Union of South Africa, and the Katanga area of the Congo, all landlocked, for access to the sea. Thus, Mozambique's four most important railway lines all come from the interior: from Nyasaland to Beira; from the Congo and Salisbury to Beira; from the Transvaal to Lourenço Marques, and the newest line from the Congo and Bulawayo to Lourenço Marques.

Traffic from the Transvaal is guaranteed by the Mozambique Convention of 1909, which provides Lourenço Marques a minimum of 47.5 per cent of the export traffic of a designated area in the Transvaal.

Although Mozambique has over 1,600 miles of coastline and a narrow interior, there is no north-south railway connecting the country or the two major ports. Aside from the four international routes, most of her 1,744 miles of railway are isolated lines leading from the coast to the interior.

Union of South Africa and South West Africa. The Union has the most highly developed transport system in Africa based on the western pattern of connecting urban, agricultural, mining and industrial centers with seaports. This vast rail network totalled 13,439 route miles in 1959, including 1,463 miles in the Union-administered territory of South West Africa, and carried more than 274 million passengers and almost 68 million tons of freight.[44]

The story of early railway development in South Africa is essentially one of connecting mining centers with ports by the shortest route. The second stage is one of opening up branch lines into new agricultural areas. Except for short branch lines to meet new local industrial and commercial development, no further major railway expansion is planned—the present capacity is considered adequate for future development.[45]

The main line of South West Africa's railway runs from Upington, near the Union border, via Windhoek, the capital,

[42] *Nyasaland, Report for the Year 1958*, 127.
[43] H. W. Stevens, *op. cit.*, p. 108.
[44] Union of South Africa, South African Railways and Harbours, *Report of the General Manager of Railways and Harbours for the Year Ended, 31 March 1959*, Government Printer, Pretoria (1959), 61.
[45] *Ibid.*, 47.

to Walvis Bay—800 miles of 3′ 6″ gauge track. Two main branches serve the sheep station of Gobabis and the port of Luderitz. A 257-mile, narrow gauge track runs through agricultural areas to Tsumeb with two short branches.

Angola (Portuguese West Africa). The transport potential of Angola is great, but until very recently few efforts were made to take advantage of these economic assets.

In contrast with most African countries, Angola possesses some of the finest harbors in Africa—Luanda, Lobito, Moçamedes, and the little-known Baia des Tigres near the South West African border. The latter is now only a fishing village, but it has one of the finest natural harbors in the world.

Lobito is the terminus for Africa's only trans-continental rail route, the Benguela Railway. It is unfortunate that this line has not had an opportunity until recently to play the strategic and economic role of which it is capable as the sole trans-continental link.

The chief problem on the Benguela Railway continues to be the congestion near Lobito where loads must be greatly reduced to negotiate the steep climb from the narrow coastal plain to the plateau—6.055 feet in 216 miles. A survey was made in 1959, for the construction of an alternate routing from the top of the plateau to Lobito to relieve scheduling congestion.[46]

In addition to the Banguela Railway, there are three other lines and a fourth under construction, all leading inland from the three ports. Beginning in the north, the 378-mile meter gauge Luanda-Malange Line serves the most important area of European farming and is being extended toward the Congo. A new line, the Congo Railway, has been started from Luanda towards Matadi.[47] A short, private, narrow gauge line goes inland from Porto Amboim to Gobela.

South of Lobito, the Moçamedes Railway, recently converted to 3′ 6″ gauge, goes southeast as far as Gambos. An extension eastward, now as far as Vila Serpa Pinto, serves newly irrigated farm lands and is to be extended to Livingstone in the Rhodesias.

Republic of the Congo (former Belgian Congo). The transport system of the Congo with 11,500 miles of railways and navigable waterways is probably, next to the Union of South Africa, one of the best in Africa.

The railways were originally designed solely to supplement the great river system, but in recent years their relative importance has been reversed as the result of the opening of new areas distant from navigable rivers. Today, the railways handle more than half of the Congo's internal traffic.[48] In 1959, there were 3,125 miles of railway consisting of three major and three minor lines.

The Leopoldville-Matadi Railway connects the Congo's only seaport area with the beginning of the navigable portion of the Congo River, and completes the Matadi-Dar es Salaam trans-continental rail-waterway route. The second major line, the Upper Congo-Great Lakes Railway (C.F.L.), operates the short meter-gauge section from Stanleyville to Ponthierville, circumventing the rapids on the Congo River, and a longer section from Kindu to Albertville, part of the trans-continental rail-waterway route to Dar es Salaam. The third major line, the Lower Congo-Katanga Railway (B.C.K.), provides the connection with the Benguela Railway and the Rhodesian system, thus forming part of the sole trans-continental rail route. It also connects near Bukama with the C.F.L. for Dar es Salaam.

In addition, there are three short lines: (1) the 534-mile, narrow gauge Vicicongo

[46] A. Bandeira, *op. cit.*, pp. 93-94.

[47] Alfred Gordon-Brown (Ed.), *Year Book and Guide to Southern Africa*, 1959, *op. cit.*, p. 322.

[48] Belgian Chamber of Commerce in the United States, "Congo Railways," *Belgian Trade Review*, November, 1958, p. 21.

Railways in the northeast tying the Uélé region to the Congo waterways at Aketi, (2) the Kivu (Cefari) Railway connecting Lakes Kivu and Tanganyika, and (3) the narrow gauge Mayumbe Railway from the port of Boma (which handles about 6 per cent of the Congo's sea traffic) to Tshela on the Congo River Delta, serving numerous European-owned plantations. This line is inadequate to handle the traffic and will probably be replaced by a road.[49] The Kivu Railway, built in 1929 to serve the heavy traffic of an European farming area, was replaced in 1958 by a modern highway which absorbed practically all of the railway's traffic.[50]

The main construction project planned is a rail connection linking the B.C.K. near Port Francqui directly with the Leopoldville-Matadi Railway, thus cutting out the long Kasai River journey. The high costs involved have delayed this project.

Next to the Nile, the Congo River and its tributaries form the most important inland waterways in Africa. The system covers more than 8,300 miles including the 807 miles of steamer services on the Great Lakes. The great natural handicap is that navigation of the last two hundred miles of the Congo before it reaches the Atlantic is impeded by a series of rapids and gorges.

[49] J. Frederick and G. Gielen, "Les Transports au Congo Belge et au Ruanda-Urundi." *Encyclopedie du Congo Belge*, Vol. III, Editions Bieleveld, Bruxelles, pp. 423-428.

[50] Office de L'Information et des Relations Publique pour le Congo Belge et le Ruanda-Urundi, *op. cit.*, p. 57.

Conclusion

We have examined the transport map of the eastern, northeastern, central and southern regions of Africa, and its paucity tells its own story. Almost nowhere is there an integrated transport complex. This has been the result of a number of difficult problems. In each of the former territories of the European nations, there has been strong forces in operation to favor use of national rail, river, and port systems to the detriment of economic efficiency.

What is needed is not the further development of small, costly, national routes, but an integrated system to serve many countries in a large continental area linking agricultural, industrial, and urban centers.

The new nations of Africa have been left an assorted legacy of transport problems. How and when they surmount these obstacles—physical economic and political—will determine the future economic development of Africa.

RECLAMATION ECONOMY IN THE HOLLAND MARSH AREA OF ONTARIO

WILLIS B. MERRIAM
Washington State University

THE DISCOVERY OF A cultural island of unusual economic and social significance, especially when created from land that was once shunned as of little use to man, is always a rewarding experience to a geographer in the field. Such an area is to be found in the Holland Marsh subregion of south central Ontario lying some 32 miles north of metropolitan Toronto (Fig. 1).

Holland Marsh involves the river valleys of the Schomberg and Holland rivers which flow into Lake Simcoe, actually they represent a shallow peat-filled southward extension of the Lake Simcoe basin. The marsh in its entirety embraces some

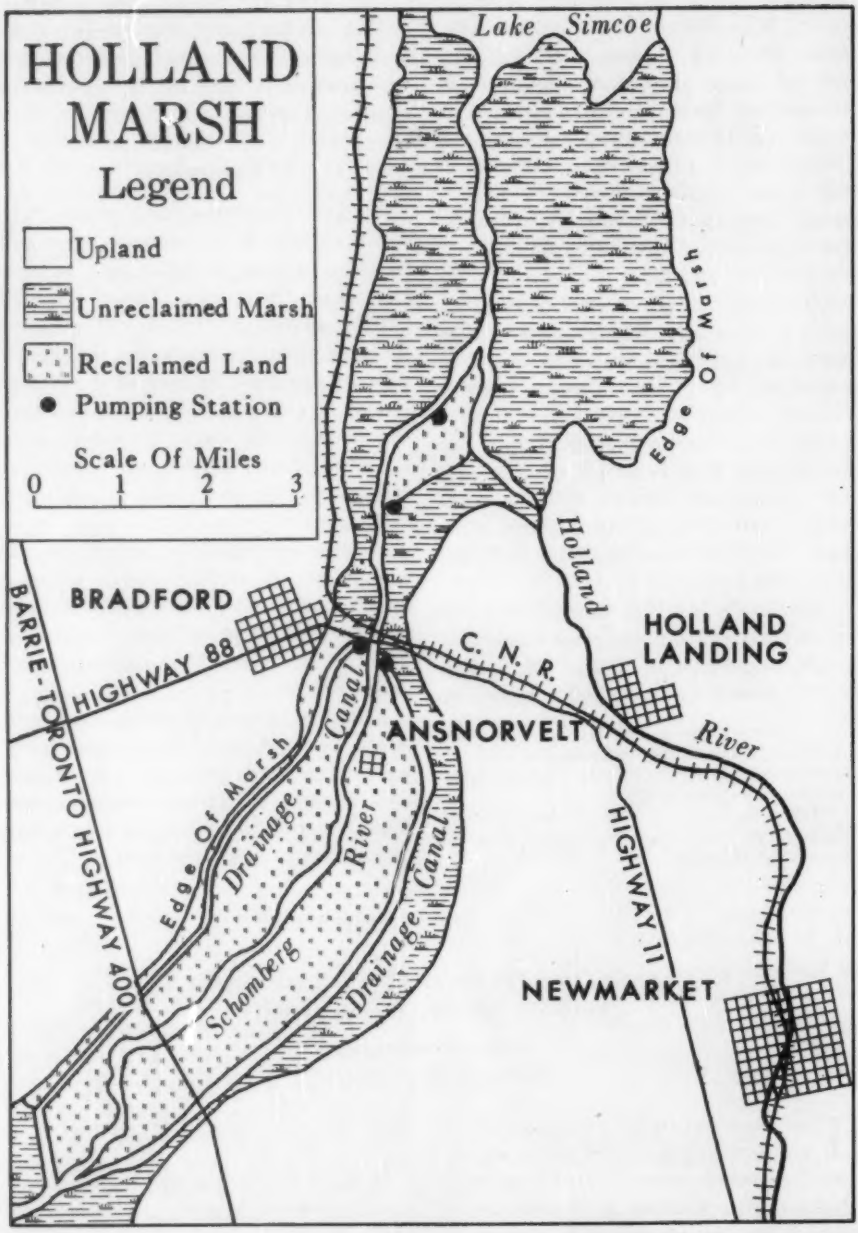
HOLLAND MARSH
Legend
Upland
Unreclaimed Marsh
Reclaimed Land
Pumping Station
Scale Of Miles
0 1 2 3
Lake Simcoe
Edge Of Marsh
Holland River
BRADFORD
HIGHWAY 88
BARRIE-TORONTO HIGHWAY 400
C. N. R.
HOLLAND LANDING
ANSNORVELT
Edge Of Marsh
Drainage Canal
Schomberg River
Drainage Canal
HIGHWAY 11
NEWMARKET

FIG. 1

20,000 acres, but the section visible from Highway 11 or from Freeway 400 is only a small part of the total involving some 7,000 acres and known locally as the "Marsh." North and east of the village of Bradford lies the "New Marsh" embracing 13,000 acres and to date only partially reclaimed.

Historically, the area has been known since Ontario's pioneer days, but it has traditionally been dismissed as a region of slight value. "A mere ditch swarming with bullfrogs and water snakes," wrote John Galt of the Canada Company when he first glimpsed the Holland Marsh in 1825.

Today, the marsh consists of more than 7000 acres of fertile land valued from $800 to $1000 per acre, exclusive of buildings. It is producing crops worth about $5,000,000, or of greater value than the production from any one of Ontario's leading mines. In the area are to be found 549 growers, approximately 60 per cent of Dutch origin. Hence, to a large extent it represents a little Holland transplanted to the boglands of Ontario.

The name "Holland Marsh" is not attributable to the extensive settlement of Netherlands farmers in the area, but takes its designation from Major Holland, the Surveyor General of Upper Canada. Marsh reed stimulated the initial use of the Holland Marsh; twisted into cord it became the first saleable product from the area.

History of Reclamation Development

It was suggested as early as 1852 that the swamp might be drained to facilitate a peat harvest for fuel. However, a proposal to lower the level of Lake Simcoe and Holland River by four feet to accomplish this project met with opposition from the towns bordering Lake Simcoe, and the scheme was abandoned.

The first actual reclamation for agriculture was attempted in 1912. Due to World War I and the subsequent depression, it was not until 1924 that serious steps were taken to implement this plan. Actual reclamation was started in 1925, with the dredging of a canal 17½ miles long and seven feet in depth through the swamp, with construction funds coming mainly from the Dominion's Municipal Drainage Act. Several dikes and ditches were completed, and a dam 450 feet long was constructed to hold back the waters of Lake Simcoe. Pumps were installed to lower the water table. Technical difficulties involving dike seepage and cave-ins put the project far behind schedule by 1930 and induced the project administrators to consult a Dutch reclamation expert who was a specialist in this type of engineering.

The project was first farmed by Canadian-born settlers, but by 1934 many had become discouraged, and plot after plot had been deserted. The land reverted to the Province for non-payment of taxes. In 1931, a few farmers from Holland came to the marsh and achieved relative success. In 1934, eighteen additional Dutch families were moved into the project area. These families received settlement grants of $600 each which were raised jointly by the Canadian and Dutch Governments. These families formed the nucleus of the present Dutch village of Ansnorveld.

By 1950, nearly half of the 500 growers on the marsh were of Dutch origin, and others from the Netherlands continued to arrive. In recent years, following the footsteps of the Dutch, minority groups, such as Hungarians, Italians, Germans, and a few Japanese, have managed to gain a foothold in the area. They represent additional highly selected settlers who are willing to work long hours in the field with specialized machinery supplemented by stoop labor. They are familiar with intensive fertilization practices on farms or plots where soil is counted in feet rather than in acres. The early British were unable or un-

willing to perform these practices. As a result, few Anglo-Saxon names are to be found in the area.

Cultural Integration

Despite the dominant foreign flavor of the project area, no serious cultural conflicts or problems of integration are evident. Minor problems, associated with a desire to retain national languages, basic and tenacious differences in cultural outlook, a reluctance to marry outside the linguistic group, and a hesitancy to take out citizenship papers, might be interpreted as evidence of lack of integration. The dominant Dutch are particularly inclined to be clannish. But Old World family solidarity is rapidly softening as the farmers themselves face a more democratic way of life and the children face a new language and new associations. There are a public school and a Christian Reformed Church school in Ansnorveld. High school students continue their education at Bradford, Newmarket, or Aurora, nearby communities which are solidly Canadian in character.

Living standards in the Marsh appear to be low in spite of general economic well-being. Housing is poor and most of the dwellings appear to be suitable for summer occupance only. Here again the standards of the Dutch are highest. The village of Ansnorveld, for example, has better housing, its own denominational school, its national church, and several attractive stores and supply centers.

There are many technical problems in the truck gardening of the area. The soils vary from clay and muck loams to fibrous, sponge-like peat, in some spots as much as 60 feet deep. Clay soil border areas are regarded as hard to work and of lesser value, but the peat areas are characterized by a remarkable ability for absorbing and holding nutrients and fertilizers. Despite constant pumping to keep the water table down, irrigation, using siphon systems, is a common though paradoxical practice. Farm holdings are small, the majority ranging from less than five to not over nine acres in extent. The average for the entire project is only 11.4 acres, although a few large holdings of more than 100 acres are to be observed. The predominance of small acreages rules out such practices as crop rotation or fallowing over most of the area. Largely because of these problems the Ontario Agricultural College has established a research station on the marsh.

TABLE I

HOLLAND MARSH ACREAGE HOLDINGS (1959)

Unit size	Total Acres	Total Growers	Per Cent Total Acres	Per Cent Growers
100	2,665	8	27.6	1.5
50-99	1,022	15	10.6	2.9
25-49	1,019	29	10.6	5.4
10-24	2,504	151	25.9	27.7
5-9	1,790	202	18.2	36.9
4	680	144	7.1	25.6
		549	100.0	100.0
Totals	9,681 (incl. bldgs.)			

Leading Crops Produced

The total acreage in production in 1959 was 7,425 acres. Major crops are

onions, potatoes, carrots, lettuce, and celery. Cauliflower, radishes, parsnips, cabbage, beets, spinach, turnips, and other garden miscellany are also produced. The leading five so dominate the production figures that their total is worth from $4,000,000 to $5,000,000 while the total of the minor crops is not much over $400,000.

To maintain high production the region has become one of Canada's, if not the world's, most mechanized agricultural districts. On 430 acres in one portion 190 pieces of operating machinery, including 27 farm tractors, 13 garden tractors, 16 ploughs, 14 cultivators, and 25 discs were counted.

The problems of marketing are also somewhat unique in the Holland Marsh. The presence of numerous national groups, the competitive nature of the work, and the "on-the-hour" marketing of perishable produce with a high degree of elasticity in prices and demand has tended to engender a spirit of individualism rather than co-operation. As a matter of record, in the early years of the project, rugged individualism was the keynote to marketing methods and co-operation was practically unknown. It was considered shrewd dealing, for example, to try to harvest one's crop a day ahead of the majority and then to race a truck to the Toronto market to capture the highest price. Then came an era of co-operative effort. By 1946, about 150 of the 500 growers were members of Bradford Co-operative Storage, Limited, which had constructed a large cold storage plant. By 1949, co-operatives were in full control. By 1952, an amended co-operative marketing scheme was approved, but since that year co-operatives have been declining steadily. In 1959, it could be said that the co-operative marketing of the late 1940's and early 1950's was completely out of the picture. Today, marketing is handled largely through two private concerns, Holland Gardens, Limited, and Federal Farms, Limited. These two firms each handle about one-third of the produce, with the balance going to market through smaller wholesalers or by independent truckers. Open-ticket sales are the rule. That is, an open bill of sale is issued to the grower with no stated price, the price being inserted after disposal of the produce at the prevailing market.

TABLE II

LEADING VEGETABLE CROP PRODUCTION (1957-1959)

Commodity	1957 Acreage	1958 Acreage	1959 Acreage	1959 % of Total	Total Crop Value 1959
Onions	1598	1484	1864	25.1	$1,268,790
Potatoes	1959	2041	1802	24.3	867,000
Carrots	1309	1717	1791	24.1	966,030
Lettuce	1148	1258	1041	14.0	566,100
Celery	441	340	379	5.1	339,840
All Others	438	617	548	7.4	400,314
Totals	6893	7457	7425	100.0	$4,408,074

Current Market Range

Besides the produce trucked directly into Toronto, over 1,000 refrigerator cars are loaded per season for such distant points as Winnipeg, Montreal, Halifax, and St. John, and Detroit and New York City across the border. Holland River Gardens handles most of the United States shipments. It frequently sends a trainload of vegetables a day to New York City, where Marsh lettuce,

in particular, frequently brings a premium of 50 cents a case over American lettuce during mid and late summer. Throughout the active shipping season there is virtually a standing order for 1,500 cases a day in Detroit. For this type of market Holland Marsh is well situated. It is 22 hours from New York by truck, whereas California, considered locally to be the nearest big competitor, is 3000 miles away. Markets appear to be unlimited, and under-production rather than over-production is the normal situation. "The Marsh can grow a greater quantity of truck commodities of better quality for lower costs than any other competitive area on the continent," is the opinion of George Horling, manager of Holland River Gardens.

With this bustling growing season activity the old village of Bradford has been stimulated to new growth, and large storage and packing houses have been built along both rail and highway lines.

Conclusion

Economically it would appear that the Holland Marsh area is one of the most successful drainage reclamation projects on the continent. The original development cost was $137,000 with later outlay probably totalling $300,000. This comes to about $53 an acre. As early as 1930 there was a gross return reported of $350 an acre on the first 37 acres checked. By 1949, the gross return was nearly $1000 an acre on the 5,698 acres then in production. The 1959 figure, due to higher costs of reclamation, production, and distribution, averaged around $714. Gross production since its inception and up through 1959 amounts to at least $85,000,000.

The drop for 1959 would suggest, however, that the law of diminishing returns is placing checks on the area for the future. The slow-down in additional lands reclaimed would also contribute to this conclusion. Only 1,200 acres have been reclaimed in the last ten years, most of which are located in the 13,000 acres of the New Marsh area between Bradford and Lake Simcoe. Local optimists speak of a total potential of 20,000 producing acres in the entire area with a $20,000,000 annual yield in value of production. More conservative estimates from the office of the Regional Settlement Supervisor suggest that not much more than 1,000 acres are still available for profitable development. Rather than extending land reclamation in the Holland Marsh, the area will have to depend largely upon successfully meeting competition from the acres now in use. Further profits must depend upon holding costs to a minimum commensurate with permanent land-use practices, high return based on quality procedure, and a minor extension in return through deep-freeze possibilities and improved consumer packaging.

References and Sources

1. Evelyn Brownell and S. Gordon Scott, "A Study of Holland Marsh: Its Reclamation and Development," Immigration Branch, Department of Planning and Development, Toronto, 1949.
2. Anthony Sas, "Some Problems Associated with the Integration of Dutch Rural Settlers in Southwestern Ontario," Abstract in *Annals of the Association of American Geographers*, 49 (June, 1959).
3. R. P. Zimmer, Regional Settlement Supervisor, Department of Citizenship and Immigration, Toronto, Personal communication dated January 19, 1960.
4. The Author's personal field observations Summer, 1959.

THE JOURNAL OF GEOGRAPHY, ZOE A. THRALLS, GEOGRAPHIC EDUCATION AWARD

The Geographic Education Award of THE JOURNAL OF GEOGRAPHY named in honor of Zoe A. Thralls, is granted for the best articles appearing in the 18 issues of THE JOURNAL OF GEOGRAPHY printed between September, 1958 and May, 1960 inclusive. This award is granted for the best article on techniques of teaching Geography at the Elementary School level (grades 1-6 inclusive).

In 1960 THE JOURNAL OF GEOGRAPHY Award Committee, appointed by President John W. Morris (if interested in the administration of this award refer to the January, 1951 issue of THE JOURNAL OF GEOGRAPHY), recommended that it be presented to Dr. Rose Sabaroff, Oregon State College not for a single article but for the following six: (1) "First-hand Experiences in Geography for Second Graders," September, 1958, pp. 300-306; (2) "Mapping Experiences in the Early Grades," October, 1958, pp. 360-367; (3) "Using Maps in the Second Grade," November, 1958, pp. 410-415; (4) "Geographic Activities for First Graders," October 1959, pp. 350-354; (5) "Maps and Mapping in the First Grade," December, 1959, pp. 451-455; and (6) "Geographic Concepts for First Graders," February, 1960, pp. 85-87. From this excellent group the committee, consisting of Elizabeth Eiselen, chairman, Maud Austin, Loyal Durand, Jr., and Mary Grant, found it impossible to select one of her articles as superior to all the others. Since the establishment of this award it has been granted four other times. In 1951, Adelaide Blouch received it for her article entitled, "City Studies in the Upper Elementary Grades," published in the November, 1948 issue of THE JOURNAL OF GEOGRAPHY. In 1953, the award was presented to Robert Wayne Trail for his article "Maps in the Primary Grades," published in the November, 1952 issue. In 1955, Thomas Frank Barton (while he was a visiting professor of Geography and Social Science, Collége of Education, Prasarnmitr, Bangkok, Thailand) received the award for his article, "Why Not Use a Sandtable?" printed in the February, 1954 issue. (The award was also granted in recognition of articles printed during the same two year period.) In 1957, the award was given to Lorena Mitchell for her articles "Geography Tests for Grade I," in the October, 1955 issue, and "Keeping a Weather Chart," in the January, 1957 issue of THE JOURNAL OF GEOGRAPHY.

THE NATIONAL COUNCIL AT WORK

The Publications Center

In 1957 the National Council for Geographic Education established the Publication Center for two purposes: (1) It is to be the place of publication of materials other than THE JOURNAL OF GEOGRAPHY, and (2) it is to be the place from which such materials are to be distributed. The activities of the Center are directed by a Publication Committee of three members composed of the President, Secretary, and Director of Publications. To assist in certain types of editorial work the Director of Publications, who is chairman of the committee, may call upon various members of the NCGE for assistance.

During the past four years several publications have been added to the already established lists of Professional Papers and Special Publications. In addition three new lists—Inventory of Source Materials, "Do It This Way" series, and Leaflets—have been added. Also an INDEX to THE JOURNAL OF GEOGRAPHY for the years 1922-1956 has been published. All have been well received by teachers and librarians. Some additions to the above lists are in progress and many others are planned.

The Publication Center is constantly searching for new material. Items dealing with both content material and methodology in the teaching of geography are needed. Detailed studies for the "Do It This Way" series of approximately 7,500 words are in demand. Pictures and maps should be included when such manuscripts are submitted for consideration. Annotated bibliographies for various grade levels are desired for the leaflet series. Geographical publications of all kinds will be considered. If you have some idea you think exceptional, or some method that has been unusually successful, why not write the Director of Publications and discuss possibilities for publication by the National Council. It must be understood that since the NCGE is a nonprofit organization items are published and sold at cost, thus it is impossible to pay a royalty to authors. Many outstanding elementary, secondary, and college teachers, however, have contributed to the list of publications now available. The latest publications are:

An Inventory to Source Materials by Arthur A. Delaney

- No. 1 Germany
- No. 2 Switzerland
- No. 3 Belgium, Luxembourg, and Netherlands
- No. 4 The United Kingdom and Ireland
- No. 5 France
- No. 6 Portugal and Spain

Each inventory lists books, booklet, brochures, exhibits, posters, maps, motion picture films, and

filmstrips about each country or area that are available free or at small cost. These sell for twenty-five cents each.

Special Publication No. 5—The Literature of Regional Geography by Ralph E. Olson. It sells for $1.50. The publication is a check list of books in regional geography.

Professional Paper No. 20—Geography: Coordinating Element in Secondary Social Studies, twenty-five cents.

JOHN W. MORRIS,
Director of Publications,
Department of Geography
University of Oklahoma, Norman

GEOGRAPHIC MATERIALS RECEIVED

Ernest S. Dodge. **Northwest by Sea.** Oxford University Press, 417 Fifth Avenue, New York 16, N.Y., 1961. 348 pages including the table of contents, chronological tables and index. $6.50

Maurice Parmelee. **The History of Modern Culture.** Philosophical Library, Inc. 15 East 40th Street, New York 16, N.Y., 1960. 1295 pages including table of contents and index. $10.00

Wesley Calef. **Private Grazing and Public Lands.** University of Chicago Press, 5750 Ellis Avenue, Chicago 37, Illinois, 1960. 287 pages including table of contents, list of illustrations, and index. $9.50

Beatrice Pitney Lamb. **Introduction to India.** American Assoc. of University Women, 2401 Virginia Avenue, N.W., Washington 7, D.C., 1960. 49 pages including table of contents, bibliography and one map. $1.00

Robert S. Platt. **Field Study in American Geography.** Department of Geography, University of Chicago, Chicago 37, Illinois, 1959. 405 pages including table of contents, list of illustrations.

John A. Wallace. **Getting to Know Poland.** Coward-McCann, Inc., 210 Madison Avenue, New York 16, N.Y., 1960. 64 pages including the index. $2.50

Jim Breetveld. **Getting to Know Chile.** Coward-McCann, Inc., 210 Madison Avenue, New York 16, N.Y., 1960. 64 pages including the index. $2.50

Patricia Lauber. **Getting to Know Switzerland.** Coward-McCann, Inc., 210 Madison Avenue, New York 16, N.Y., 1960. 64 pages including the index. $2.50

Christie McFall. **Hawaii.** Maxton Publishers, Inc., 15 E. 26th St., New York 10, N.Y., 1959. 15 pages. $1.38

E. Joseph Dreany. **Alaska.** Maxton Publishers, Inc., 15 E. 26th St., New York 10, N.Y., 1959. $1.38

Clara Ingram Judson. **St. Lawrence Seaway.** Follett Publishing Company, Chicago, Illinois, 1959. 160 pages including maps and drawings. $3.45

Louis G. Romano and Nicholas P. Georgiady, M. S. **Exploring Wisconsin.** Follett Publishing Company, Chicago, Illinois, 1957. 127 pages including the index, pronunciation guide, and table of contents. $2.58

Harold T. Hagg. **Exploring Minnesota.** Follett Publishing Company, Chicago, Illinois, 1958. 160 pages including table of contents, list of films, filmstrips and tapes, and the index. $3.45

Margaret S. Ratz and Charles H. Wilson. **Exploring Chicago.** Follett Publishing Company, Chicago, Illinois, 1958. 128 pages including table of contents, index. $2.49

BOOK REVIEW

John C. Caldwell. **Let's Visit Indonesia.** John Day Company, Inc., 210 Madison Avenue, New York, New York, 1960. 96 pages with index and table of contents. $2.95. Ages 8-12.

After locating this island state in relation to its neighbors and giving some general information about size and physical makeup, the author describes, in a very readable style, the four major historical periods that have shaped the development of the islands and peoples of Indonesia. Then he follows brief glimpses into such topics as the various ethnic groups, farming and farm produce, education, games, and festivals. Bali, with its colorful pageantry, is given separate treatment because of the greater familiarity of Americans with this island.

Although there is a generous supply of factual information considering its small size, there are far too many inaccuracies. Geography and social studies teachers will be interested to learn, for example, that "Alabama . . . is the state . . . with the heaviest rainfall" (p. 18); or "The islands are of volcanic origin . . ." (p. 19). Borneo, the largest island, has no volcanoes. Again, "some races like the Bataks of Borneo have become Christians in large numbers." (p. 42). In fact, the Bataks are located in northern Sumatra and the word "race" should certainly not be given an ethnic meaning. He is also in error in stating that most Indonesians eat with their fingers (p. 47) or in giving the strong impression that most Balinese youth file their teeth to a point (p. 83). The latter custom is almost non-existent today. Errors of this nature are found on at least 15 pages.

To sum up, the book is visually attractive, has a lot of factual information interestingly put together, but because of its many errors, it is not a first-rate job. On the other hand, there are few books on this important country for this age group (ages 8 through 12), and this one, all in all, is a contribution.

DON C. BENNETT
Indiana University

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BOOK REVIEWS

Walter W. Ristow. **Aviation Cartography.** Card Division, Library of Congress, Washington 25, D.C., 2nd Ed., 1960. 245 pages with index. $1.75.

Few geographers fully realize the importance of maps in the development and operation of modern aviation. In this second and enlarged edition of **Aviation Cartography,** Dr. Ristow traces the chronological development of this dynamic branch of map making and brings his extensive bibliography on the subject up-to-date.

The evolution of aviation cartography is skillfully traced, a decade at a time, through 53 pages of text. In these pages, the author summarizes each major advance in cartographic technique and substantiates his observations by directing his reader to the appropriate entry in the accompanying bibliography. With a minimum of words he outlines the attempts of each country to cope with the problems of producing air maps to meet ever-changing needs. For example, a development such as the establishment of regular airmail service required cartographic innovations such as photo maps and strip maps. The two World Wars, with their unprecidented demands upon aviation cartography, are dealt with in some detail, and the work of many cartographers is duly noted. The text points up the contributions made throughout the world and avoids the fault of ethnocentrism.

The dramatic developments of the last decade are underscored by the fact that the author devotes nearly half of his text to this period which inaugurated the space age. The geographer in the classroom is only dimly aware, if at all, of the problems involved in equipping our super-sonic, high-altitude jet aircraft with specialized maps. Dr. Ristow outlines these problems in terms that his colleagues can readily understand. This is accomplished through his notes on research and recent analytical studies.

The bibliography in this book consists of 774 references arranged alphabetically by author or publisher. An expansion of 311 entries over the listings in the 1956 edition, nearly all of which represent recent publications, accents the amazing growth in this relatively young branch of cartography. To help the potential user, the author has included an index with a subject approach to the references as well as the Library of Congress call numbers.

Our field of geography is indebted to Dr. Ristow for this excellent work. In the text he has given us a specialized history, and in the bibliography he has provided us with a useful tool to learn about a modern and dynamic branch of cartography.

ROBERT J. GOODMAN
Wayne State University

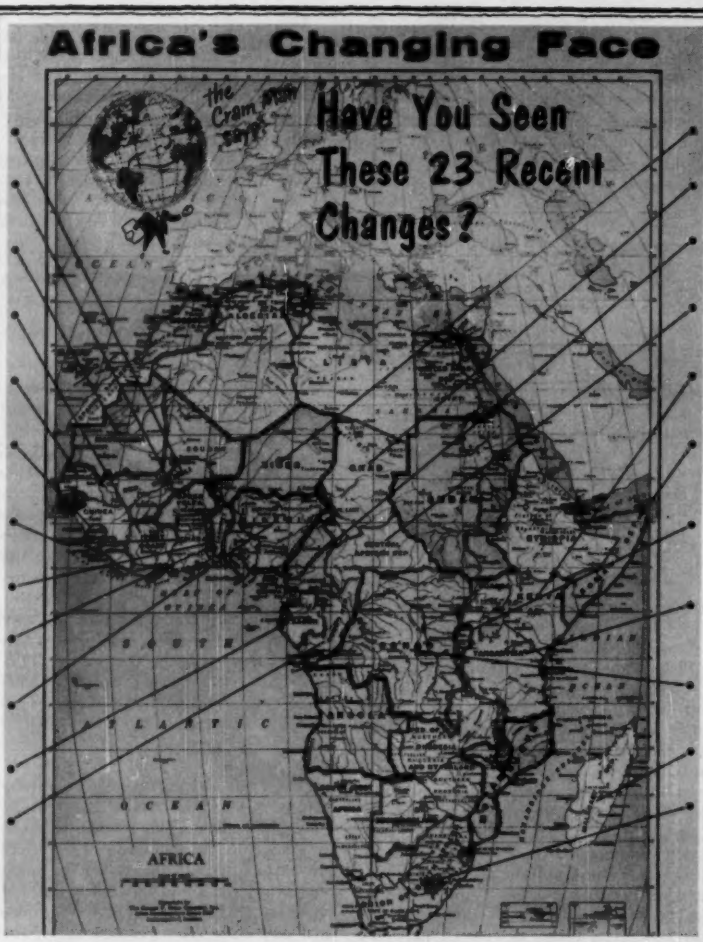
Lloyd A. Brown, **Map Making: The Art That Became a Science.** Little Brown and Company, Boston, 1960. 217 pages including Table of Contents, Index, and over fifty maps and illustrations. $4.75.

Here is another book by Lloyd Brown which should be received with interest. His ability to make a difficult subject appeal to a wide range of readers is well known. In this volume the author has presented a digest of his previous work, **The Story of Maps,** setting forth the basic ideas on a level acceptable to younger readers.

The content includes a history of map making through the ages pointing out the importance of maps to early man. As civilization became more complex, mapping techniques improved because of the necessity for a better understanding of the world. The impact of man's technological growth upon the development of cartography as a science is evident throughout the book. New instruments of survey have resulted in greater precision in mapping. This in turn has enabled modern nations to more accurately evaluate their potential.

(Continued on page 146)

Africa's Changing Face



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Several chapters give brief sketches of early scholars from the time of Strabo, Pythagoras, Aristotle, and other philosophers to the era of Eratosthenes and Ptolmey illustrating their contributions to cartography. The accomplishments of other important men who helped lay the foundations of scientific cartography from Gutenburg and his printing press to John Harrison and his clock are described.

This book should appeal to readers both on the secondary and college levels. As a source of supplementary reading, it shows the practical relationships of some phases of the sciences and their historical development with the growth of Western Civilization.

In such a short study the author makes no effort to present a complete development of cartography as a science. A large number of maps and illustrations amplify the text, but some of these fail to carry the thought intended. Regardless of this minor fault this book is a worthwhile addition to any secondary school or college library.

CHARLES A. VIGH
New York State University
College of Education, Oswego

Alan K. Jakeman. **Getting to Know Japan.** Coward-McCann Inc., New York, 1960. 64 pages illustrated by Donald Lambo. $2.50.

This little volume is one of more than twenty "Getting to Know" books that have been written about various countries of the world. It is aimed at the 8-12 age group. The author is an English teacher who received his understanding of Japan and the Japanese during one year's duty there with the U.S. Occupation Forces after World War II.

The author tries to present the flavor of Japan in a story-telling mood. After pointing out the abundance of people and the scarcity of land, he presents an historical sketch of the country and makes a few comments about the government, the importance of the family in the social structure, the veneration of the aged, and festivals. Then the reader is taken into the house of Yamamoto Notsuke, a young lad who by western name order really is Notsuke Yamamoto. In the environment of this household one encounters descriptions of the house itself, manners and habits, meals, flower arranging, clothing, the bath, and sleeping facilities. Notsuke's school and recreation activities are sketched, too.

Leaving Notsuke's house the reader is taken down streets, through markets, and over the nation's railroads. During this tour and in a completely disorganized fashion, minerals, manufacturing, religion, tea, silk, fishing, art, Mount Fuji, earthquakes, bamboo—and yes, cherry blossoms too, come in for a few words of description. Most statements that are made are accurate. Even the child, however, may be impressed with the childishness of such comments as "Traveling northward . . . you get a few swift glimpse of foxes and badgers hurrying through the forests. . . ."

The illustrations by Donald Lambo are interesting, although at times they contradict reality or the text. As an example of the latter, on page 11 the sketch shows curving, irregularly-shaped rice paddies on a terraced hillside, but the author comments in the text that "A farm of rice paddies looks like a giant checkerboard with squares separated by small dikes!" There is only one map and that one is poor.

A child 8 to 12 years old will probably enjoy reading this little book and will learn something from it, too, but one cannot help but ask if children might not enjoy it just as much and get immeasurably more from it if the level of sophistication and quality of organization were raised.

JOHN H. THOMPSON
Syracuse University

Paul Wittich and Gertie Halsted, editors. **Educators Guide to Free Tapes, Scripts, and Transcriptions.** Educators Progress Service, Randolph, Wisconsin. 1960. 225 pages. $5.75.

"The seventh edition lists, classifies and provides complete information on sources, availability and contents of 129 free tapes, 230 free scripts and 106 free transcriptions, a total of 465 valuable materials. Of these, 155 are new starred titles." In spite of these impressive figures, this Guide is of limited value to anyone wanting typically geographical materials. Of the 465 only one listing, a transcription entitled *North American Rubber Plantation*, is listed by the editors under the heading of geography. This observation, however, does not imply a condemnation of the Guide makers who provide an outstanding service in seeking out and then describing audio materials for many fields of education, especially Social Studies.

The Tape Adventure service offered by the Educators Progress Service may be a way that more tapes, scripts and transcriptions concerning geography could be encouraged. According to the editors, arrangements can be made for elementary, junior, and senior high school students to exchange self-made tapes on subjects of their own choosing. Why not encourage our students to take advantage of this service to increase the offerings in geography?

FRANCES M. HANSON
District of Columbia Teachers College

B. W. SPARKS. **Geomorphology.** Longmans, Green and Co. Ltd., London, 1960. xx and 371 pages, including 201 sketch maps and diagrams, 51 plates, index. $7.75.

This well written and well illustrated textbook is designed for upper division undergraduates who already have a basic knowledge of physical geography. The author, lecturer in geography at Cambridge University, believes that geomorphology is concerned with (1) the evolution of landforms, (2) the evolution of landscapes, and (3) a study of processes. In the first instance the objects of study are primarily relief

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features resulting from either erosion or deposition. The origin of major earth features, essentially a study of tectonics, he considers to be more the field of the geophysicist than of either the geologist or the geographer. In so far as they affect relief features, however, Sparks neglects neither structure nor vulcanism, for the former is considered in the chapter on the development of drainage systems and both are dealt with in the chapter on the affects of rocks on relief. This latter chapter, a reflection of a recent trend in geomorphology, is a particularly fine treatment of a subject that is too often neglected in textbooks except in the most general terms.

Many present day landscapes date back to the Pleistocene and the Pliocene, and some even originated in the Miocene. They developed, therefore, under climates which were different from those that presently prevail, and the processes at work as well as their rate of development also were probably different. For this reason, Sparks considers the study of the evolution of landscapes more than denudation chronology or the counting of peneplains, and four chapters deal specifically with the evolution of landscapes. One is concerned with movements of base level, another with the importance of changes of climate. A third is entitled "Other Effects of the Ice Age," and a fourth considers "Erosion Surfaces and Their Interpretation." Sparks also has an excellent chapter on the development of slopes, another topic which is being given increasing attention by geomorphologists.

Although most of the pictures and sketch maps pertain to the British Isles, eighty per cent of the diagrams illustrating the text are of a general nature, and examples referred to in the text are well chosen from all over the world. There is a well selected bibliography after each chapter. When supported by slides and U.S.G.S. topographic quadrangles, this textbook should prove very satisfactory for use in this country.

KENNETH J. BERTRAND
The Catholic University of America

International Migration 1945-1957. International Labor Office, Washington Branch, 917 15th Street, N.W., Washington 5, D.C., 1960. 414 pages. $4.00.

At no time in history have more people been set in motion by political and other forces than during the last fifteen years. A careful estimate of the numbers of those who took part in the "Wanderings of Peoples" during the closing years of the Roman Empire falls very far short of the fifty millions who have recently become refugees. Migration, in this book termed "economic migration," there has always been; people somewhere have always been attracted by the apparent superiority of opportunities elsewhere, and have migrated from Europe to America, South Africa or Australia, from China to Malaya,

from India to East Africa. From the nature of of things these migrants were, in general, assimilable; they would not have gone if there had been no opportunities for them. Migration of this kind continues, and in this book, performs a valuable service in measuring it and analysing its function. But it is the flood of refugees who in recent years have poured out of Eastern Europe, Palestine, India, Pakistan, North Viet Nam, North Korea, and threaten to continue with every crisis along the frontier between the Free and the Communist World, who present the most challenging problem. The amazing thing is not that a million Arab refugees still live in tented camps in the Middle East, but that the majority of the refugees have been found jobs and are well on the road to assimilation in a new home. This, one of the foremost achievements of the post-war period, is reviewed in the first part of this book, which provides for the first time an evaluation of recent and contemporary migration on a world scale. It is an invaluable compendium to every student of human geography.

NORMAN J. G. POUNDS
Indiana University

John C. Caldwell. **Let's Visit Ceylon.** The John Day Company, Inc., 210 Madison Avenue, New York 16, N.Y., 1960. 96 pages with table of contents, photographs, index, and one map. $2.95. Ages: 8-12.

Ceylon has an aura even today of mystery and magic. To many young Americans this tropical island spells adventure. In *Let's Visit Ceylon*, John C. Caldwell makes that general assumption a reality. This easy-to-read book, addressed primarily to children (ages 8-12), takes the reader on a trip through Ceylon in pictures and text. It can be heartily recommended both as a fascinating introduction to young readers, or a general guidebook for those who have never seen Ceylon, or as a nostalgic reminder for those who once knew and loved Ceylon.

The book contains a fine variety of more than forty-five pictures in black and white of a territory which seems especially created for visitors loaded with cameras and film. Mr. Caldwell's book also has a style that is often as vivid and sensitive as the photography. The text combines bits of geography and history, impressions of today, and questions for tomorrow. Inbetween, are well-written, concise accounts of legends and festivities celebrated in this varied land peopled by the nine million Buddhists, Hindus, Moslems, and Christians.

The narrative has an irresistible appeal because it combines suspense with fascinating facts about people and places. Children will be fascinated as much by the author's account of the elephants and water buffaloes as by the stories of magnificent temples and monasteries. It is hard to think of another book on Ceylon for the younger reader which even approaches this one in capturing the mood and image of this tropical island. The book is accurate, crisply written, and as clear as the tropical air of Ceylon's countryside.

PRADYUMNA P. KARAN
University of Kentucky

Harvey S. Perloff, Edgar S. Dunn, Jr., Eric E. Lampard, and Richard F. Muth. **Regions, Resources, and Economic Growth.** Published for Resources For The Future by Johns Hopkins Press, Homewood Baltimore 18, Maryland, 1960. 716 pages, including 96 maps and graphs, index and table of contents. $12.00.

Regions, Resources, and Economic Growth is another notable volume by staff scholars of Resources For The Future. The study is a description of economic change by states, an appraisal of influences of location factors, and an effort to quantify the changes in meaningful terms. The regions implied by the title are groups of states, and resources *per se* are not treated. Few readers will find the ideas new, but the book provides a major accumulation of useful quantification of economic and demographic change in the United States.

The study is especially valuable for its methodology. In particular, two useful techniques are utilized: (1) *differential growth or shift*, which is a proportional share analysis in which the base level is the national rate of growth, and (2) *proportional shift* which is a measure of change in composition of employment. Statistically, it is derived for each state as the difference between total employment change and the differential growth.

The book is organized into five parts. Part one (3 chapters) reviews population growth and economic change since 1870. Neither the continued economic dominance by the Manufacturing Belt (64 per cent of manufacturing employment and 53 per cent of national income in 1957) nor the phenomenal growth record of California will surprise geographers. Part two (6 chapters) presents valuable review of basic concepts and theories of locational and regional economic analysis. Part three (9 chapters) appraises population and economic development 1870-1950 by states and groups of states, i.e. the regions. Part four (8 chapters) appraises change by major facets of economic activity, mining, agriculture including forestry and fisheries, and manufacturing. Part five (8 chapters) focuses on income especially per capita income differences and changes.

The study, in places, is heavy reading, but well worth the effort and is commended to geographers for its methodology as well as information on economic change within our nation.

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Oregon State College

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